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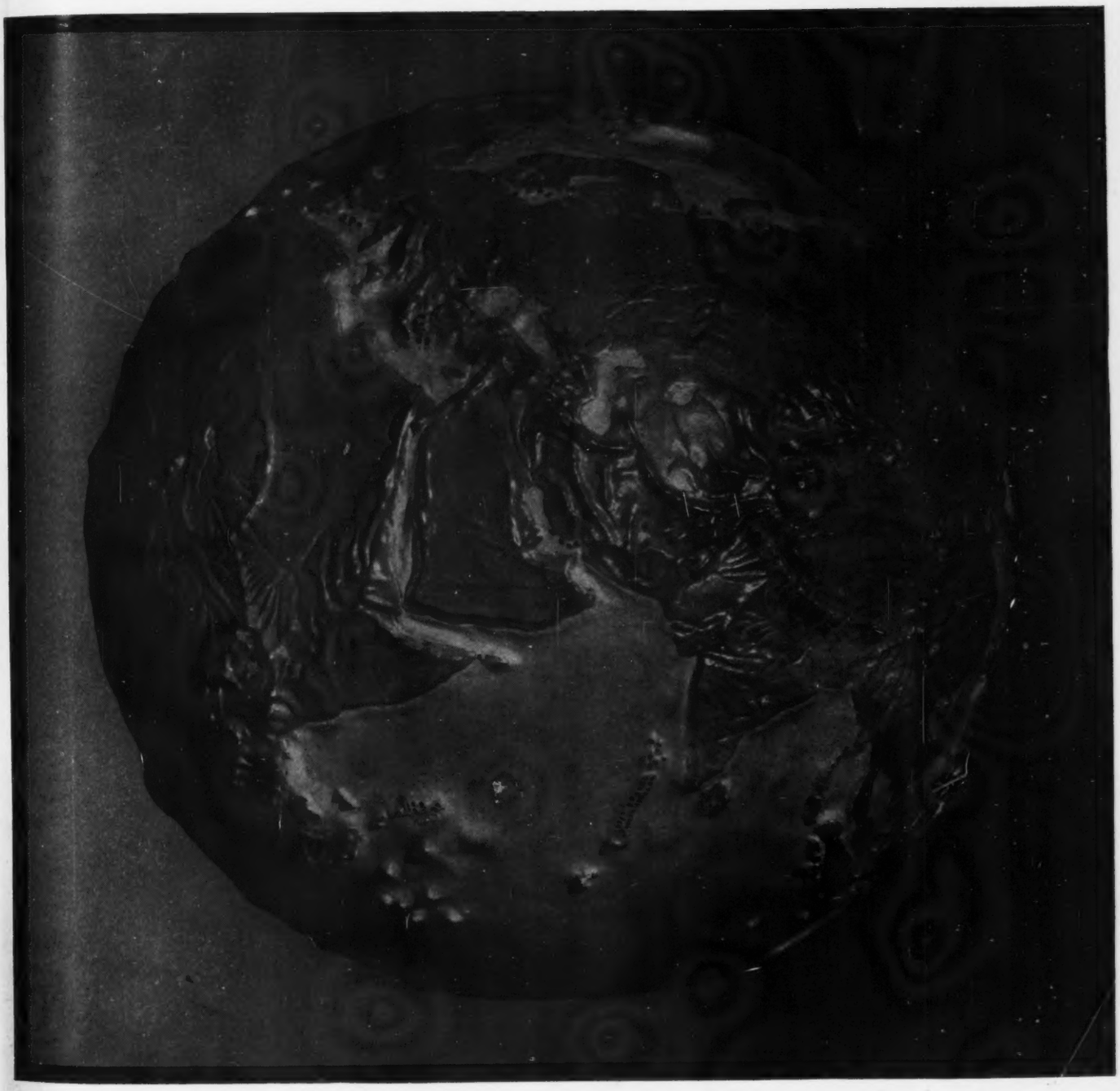

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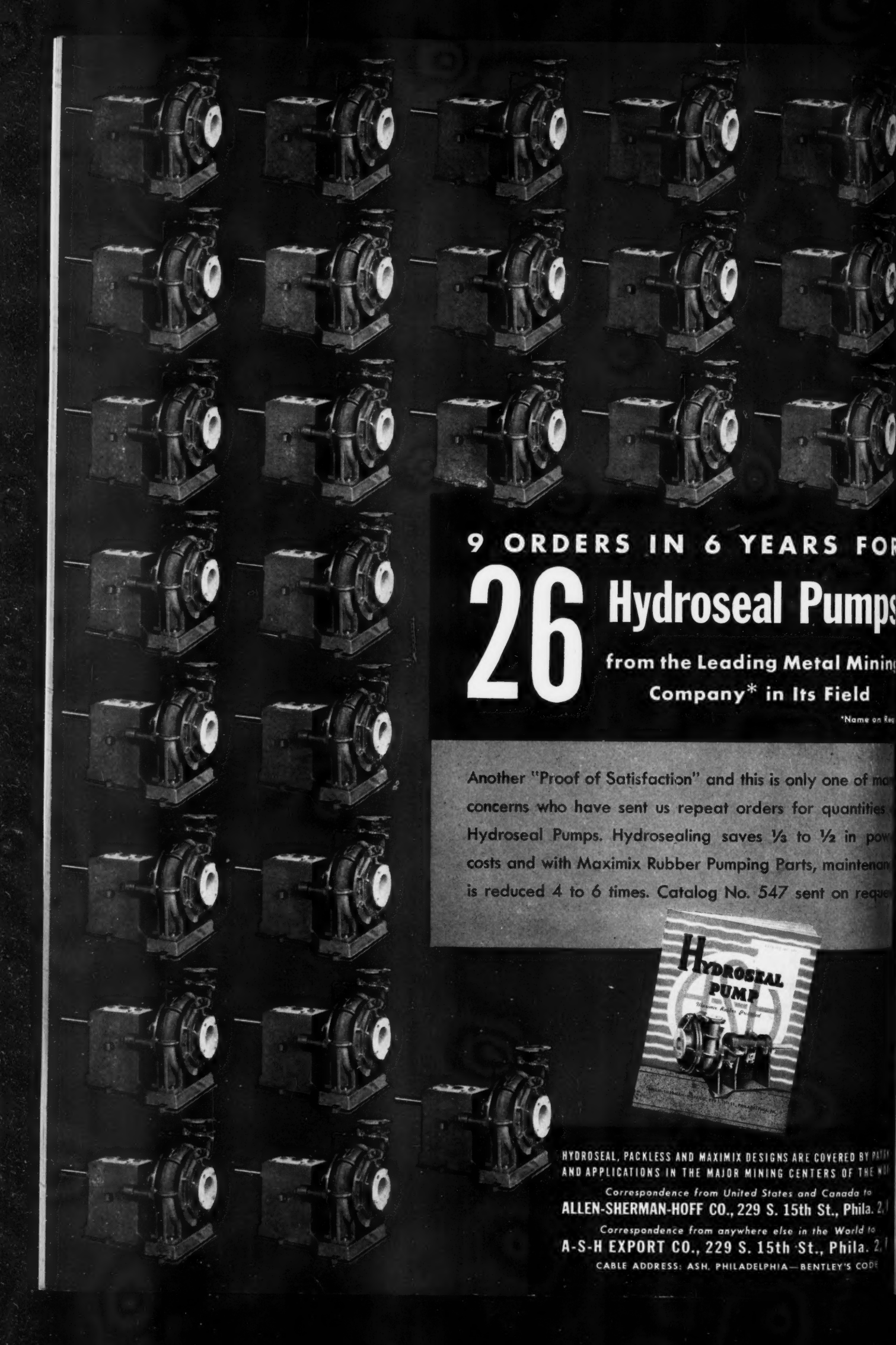

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ENGINEERING AND MINING JOURNAL

OCTOBER, 1948

Why Help Europe's Mines?

THE VIOLENCE, intransigeance and bad faith with which the Russians continue to thwart the attempts of the Western Allies to find a peaceful and equitable way out of the Berlin crisis must certainly have convinced all of us by now that we are fighting for a principle. It is an economic war that is no less deadly than if it were being fought with bombs and bullets. It is a conflict that the West cannot afford to lose.

We cannot, therefore, permit our resolution to be watered by doubt of our purpose, or our strength to be blunted by confusion as to our objectives. We in the mining industry have a job to do in clarifying these objectives as they affect our own position. No better example of this task could be found than in the question that heads this discussion.

Why help Europe's mining and metallurgical industries? Why pour out our funds, and use up our none-too-plentiful metals to build up foreign industries that will one day be competing with us? There are three reasons in answer that seem to be compelling.

First, we have a choice between helping Europe to re-establish a decent, self-respecting way of life, or of dropping the whole thing and handing Europe over to the totalitarian rule of the Communists. To take the first course will be to shoulder the responsibilities of world leadership to which our strength and our integrity of purpose entitle us. To take the second would be to announce to the world that we deny the cause for which the Second World War was fought and that we toss away the sacrifices by which that war was won.

Second, we must help get Europe's mines going because they are a basic and essential part of the continent's industrial fabric. Without its industries, Europe must continue to be no more than a dead weight that we must continue to support.

Consider it for a moment purely selfishly, if you will. At the time of writing, the United States had granted, not loaned, to the ECA countries in Europe somewhere around a billion and a half dollars. About 80% of this sum went for food and other commodities. Only 20% went for the machinery, tools or transportation units that alone can put the Continent back on a more nearly self-supporting basis.

Again we have a choice. We can go on aiding Europe, with all the burden to our economy and the damage to Europe's morale that such a course would entail. Or we can build up their mines and their other industries to the point where they can take care of themselves. As taxpayers, we should find the choice an easy one to make.

Third, it is by no means certain that re-established European mines and smelters need be a competitive threat to those of the United States. If you consider the potential demand for metals on a world-wide basis, you can find much evidence to indicate that the world's metal producing capacity is not great enough to meet this demand.

Stirring in men's hearts all over the world, in both hemispheres, and to the east as well as the west of the Iron Curtain, is the hope for peace and for time enough to build a better life for themselves and their children.

Hope of that kind will keep people working, but they can get the opportunity to work only through continued expansion of industry on a world-wide basis. Any such expansion of industry means a demand for metals that world's mines and smelters would be taxed to the limit to fulfill.

In the light of these three reasons, the editors of this magazine have done their best to collect for publication the most pertinent and the most up-to-date facts relating to the status of metal and nonmetallic mining in the ECA countries and their colonial dependencies. Using these facts, it should be possible for our readers to form opinions on how much help European mining needs, how best it can be administered, and what results should be expected from that help.

Data on Germany, Italy, and Austria are presented in this issue as the first of a series of articles, because they are the very battlefront in our cold war with Communism, and because they hold the key to development of Europe's industry. For example, without Germany's mines, the Ruhr industries can not develop to full strength once more, and without the Ruhr's industries European development is stalled.

We offer these reports on European mining, therefore, in the hope that they may play some part in the decisions that must soon be made in setting the future course of the whole program of aid to Europe. It is vital to our way of life that this course be charted intelligently and pursued with vigor and unanimity.

The Price of Strikes

ON SEPTEMBER 4, the nine-week stalemate in the strike at the Tri-State mines of Eagle-Picher Mining & Smelting Co. ended with settlement of the issue that had kept the men out of work for so long. It was not a question of wages that prolonged the strike; it was a matter of whether or not the company would have the right to pass on the qualifications of the men who went to work for it. In the end the company won that right.

What did the Eagle-Picher employees, the company, and the industry of the United States pay for this unsuccessful effort of the union's leaders to grab more power? The employees lost between 75,000 and 100,000 man-shifts, the equivalent of more than a million dollars in wages. The company lost the income from about two million dollars worth of lead and zinc concentrates. The country as a whole lost the use of 15,000 tons of zinc concentrate and 3,500 tons of lead concentrate at a time when it could ill afford to do so. If this makes sense to anyone, we would be grateful for his explanation.

Rather uglier has been the situation in the strikes at mines of the American Zinc and St. Joseph Lead companies, where the issue causing the strike has had no bearing on wages or working conditions. Employees were called away from their jobs because their leaders were unwilling, or unable, to sign the anti-Communist affidavits required by the law. St. Joe's men are now back at work. Both groups had nothing to gain. They had already been granted, or the company stood willing to negotiate, wage increases. Winning the strike in such a case would mean only that they would continue to be led by men whose loyalty to the United States is highly questionable to say the least. There is no possible perversion of logic by which a strike which has been called on such a basis can be justified.

We are encouraged somewhat by the growing indication that those leaders of the Mine, Mill and Smelter Workers Union who seem to put Russia ahead of their own country and their fellow-workers are beginning to lose their grip on what is left of their union. Locals have slipped away, one after another, and at St. Joe, for example, an independent union led by men who can sign anti-Communist affidavits with a clear conscience, is being formed by workers who are tired of the double-dealing of the left-wingers.

We believe that the managements of these two companies, as well as those others who have stood up against Communist labor leaders, are to be congratulated for refusing to let dire economic pressure force them into a course they felt to be wrong. In the long run, the best interests of both the country and the mining industry will be served thereby.

We also believe that the lesson to be learned here should not go unnoticed, and that mining management in general should resolve that, if it can be prevented by clear explanation to employees of the issues involved, never again will exponents of a foreign and disruptive ideology gain control over the unions of the metal mining industry.

Bonanza in Iron Ore for One of Gold

THUMBING THROUGH issues of *E&MJ* of 25 years ago. we find comment on a prospectus for the promotion of a gold mining venture in Labrador. Up to that time the name of Labrador for most people had been a synonym for bleakness and frigidity. It recalled also to some minds a noted mission for the benefit of Indians and trappers. The region was less associated with ideas of metals than of fur and fish. Any knowledge of possible minerals there had place no doubt only in the mind of an occasional geologist. The promotion mentioned soon was stamped by Government and other authorities as being of the get-rich-quick sort. Existence of any such bonanza, they said, was most unlikely. And so for the portion of the public that had taken note, the idea of bonanzas in Labrador soon faded out.

This was not the case with the Hollinger interests of Montreal. Experienced and successful in gold mining in Ontario, they were gold-minded and to them Labrador was not lacking in promise. With them as with the Cousin Jack, "ore is where is." As it has turned out, they found a bonanza in Labrador, but its wealth is in iron, not gold. Their explorations in this northern region to the end of the current season have shown what may be another Mesabi Range. In the great geological trough of Labrador, iron has been shown by drilling to occur in enormous tonnages and in ores of excellent grade. Other metals also occur, but the discovery of the moment is iron. Associated with Hollinger are the Hanna interests, experienced iron ore operators of Cleveland.

Cautious in their attitude toward a new mineral find, the principals have talked little, made no claims. Accumulating evidence points to the discovery of a mineral province of first rank. Remote and inaccessible save by air at the moment, the

new resource appears great enough nevertheless to justify making the huge investments that will be required to get the ore to market. As with every great discovery, the full measure of this reserve will not be known for years. The interesting story will be told more fully next month.

Our get-rich-quick promoter of 1923 was right about the bonanza, wrong as to the metal and its whereabouts. At any rate, he focussed attention momentarily on a region that was destined to be a great mineral storehouse of the future, though then unknown to all.

Coal and Metal Mine Operators Get Together

DISSENSION has never existed between the two great branches of the mining industry producing coal and metals. On the other hand, neither has any marked feeling of fellowship been noted. This has been true even in those societies and associations that include men of both branches in their membership. Executives and engineers of the two groups have for the most part gone their separate ways. Each individual has stuck to his own group, joining in its meetings and conferences. Yet the technologic, economic and administrative problems that coal and metal men have had to deal with have not been dissimilar. The attitudes of the older men, moreover, seemed to have been communicated to recruits just starting up the ladder. One would think a branching of the ways confronted the student on graduation, and that change from coal to metals, or metals to coal, was impossible thereafter.

Each group's resulting ignorance of the other must surely have retarded the progress in both branches of the industry to some degree. The great advance in modern industrial practice has paralleled the remarkable development of means for exchanging information provided in the technical and industrial press, in the technical society and the trade association.

So it is encouraging to note that recently a group of anthracite men toured the Mesabi to observe open-pit iron mining practice. The visit was soon returned by a party of iron-ore men who inspected strip-mining operations in the anthracite area adjacent to Hazelton, Pa. Each group found something of interest in the other's practice. The details in this respect are for the moment less important than the realization on the part of each that they were on familiar territory when visiting the other. The similarities outweighed the differences. This mutuality of interest should promote the sense of fellowship and solidarity. The explosives company that arranged both visits is to be congratulated on its initiative.

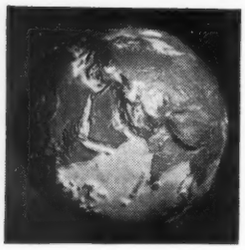
Where Do We Go From Here?

THE PAST DECADE has been fruitful in improvements in mining practice. Use of trucks, conveyors, 'dozers and kindred equipment in open pit mines has seen a great development. Innovations in drills and other hole-making machines have played a part in lowering the cost of breaking ground. Prospect drilling has seen a remarkable advance. Beneath the surface, drilling, loading and transport practice have all taken a good step forward. Some new developments, as that of tungsten-carbide bits, are still in process of evolution and it is not yet possible to say what the outcome eventually will be. In any case, mining practice has undergone numerous changes that spell less labor and lower costs for many operations. It surely has not been static, in contrast to the preceding decade. Then changes of the degree of those we have noted were comparatively rare.

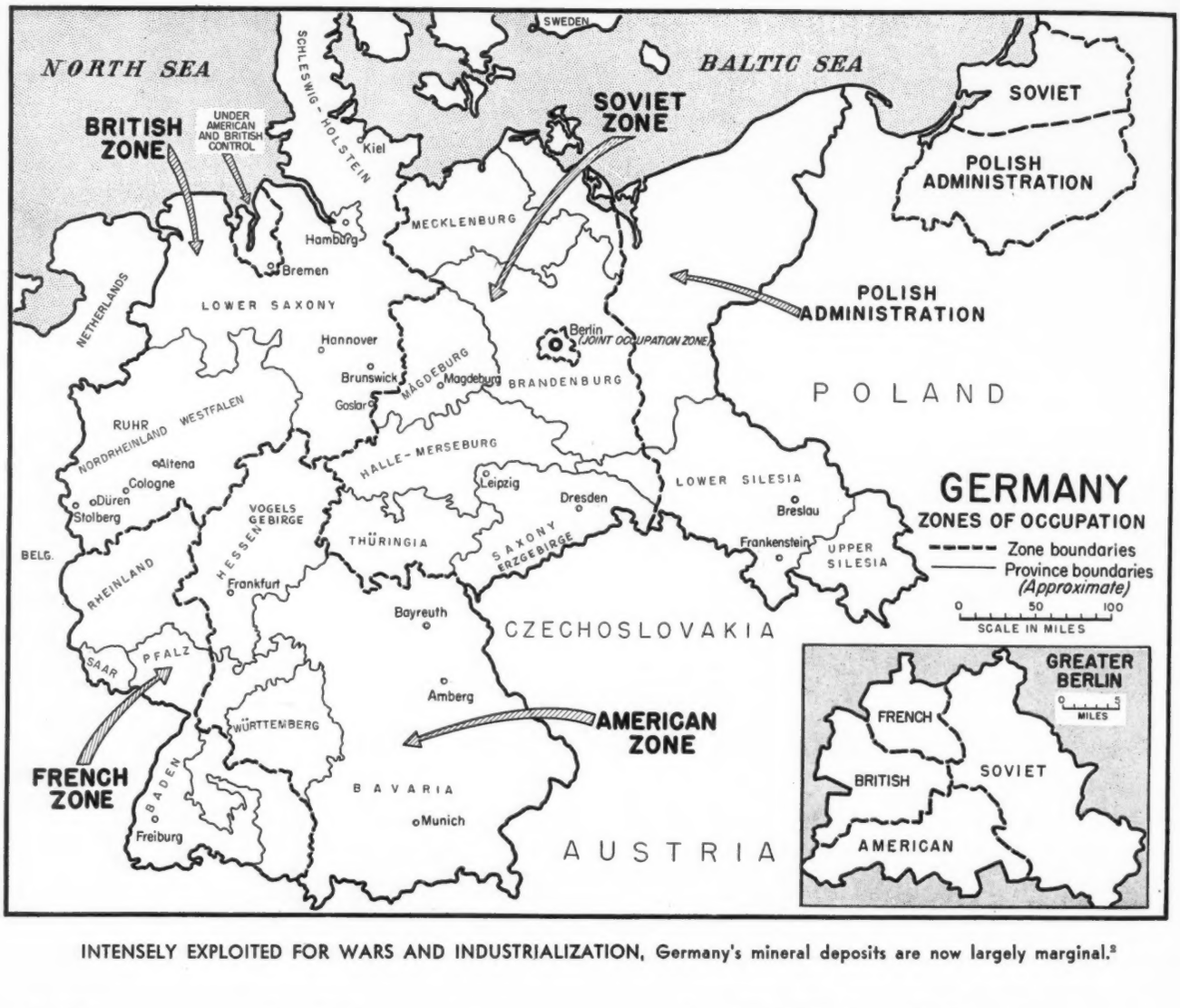
Milling practice similarly has exhibited new things: The decade has seen the development of sink-and-float separation on a commercial scale, of concentration on spirals, of the application of flotation to many non-metallic minerals and of automatic control of milling processes on a scale hitherto not witnessed. Metallury also is seeing innovations.

Where does the industry go from here? Rising labor costs will continue to make it worthwhile to save labor by all and any means. Machinery, lubricants and other supplies are probably susceptible of improvements in ways that are only beginning to suggest themselves. The use of radioactive tracers in flotation can probably be duplicated for purposes of study in other branches of mining and metallurgical work. New ideas need not be confined to the research department. Alert users of equipment in mine and mill are usually productive of ideas. The germ of many an improvement has often been further down the line than foreman or superintendent would care to admit.

The time is one for every operator to be on his toes. Continued lowering of unit costs is necessary for many a company if it is to stay in the mining business. Many an individual likewise will find it worth his while to give this matter some consideration.



How Germany, Austria, Italy, menaced by Soviet pressure, split by the Iron Curtain, but aided by the democracies, are re-establishing their mineral industries[1]



INTENSELY EXPLOITED FOR WARS AND INDUSTRIALIZATION, Germany's mineral deposits are now largely marginal.[2]

Mineral Position of ECA Nations

JOHN C. CHRISTIE
McGraw-Hill World News Bureau, Berlin, Germany

No. 1—GERMANY

PROGRESS IN THE RECOVERY of Germany's mineral industry is being slowed down by the same factors that cloud the over-all four-power occupation program. Most serious is the difference in political thinking which splits the east and west along the Iron Curtain and disrupts the interchange of metals and minerals vital to both zones. Shortage of coal is another deterrent. Labor supply, particularly after recent currency reforms, is not a problem, except in some phases of the smelting industry. Other factors include Britain's leanings toward nationalization, and America's insistence on de-cartelization. Despite these difficulties and productive capacity damaged during the war, western

[1]First in a series of timely articles on the mineral position of the ECA countries.
[2]Department of State, Map Division, map was used to prepare above illustration.

DUISBURGER KUPFERHUETTE exemplifies western Germany's dependence on complex smelting of residues and scrap for metals.

Bi-Zonal Imports (Metric Tons)

	1947	1948 (First 6 Mo.)
Magnesite	15,975	9,550
Kaolin	13,160	4,600
Diamonds	52,000 (carats)	120,600 (carats)
Pyrite	280,475	468,302
Manganese silicon	1,000	1,300
Ferrosilicon	2,723	1,907
Ferrochrome	3,869	6,585
Tungsten	408	60
Ferromolybdenum	283	20
Copper	3,048	7,163
Aluminum	12,047	14,056
Nickel	849	384
Tin	492	1,467
Zinc	2,775	4,163
Iron ore	Not Reported	724,450

THESE IMPORTS are not the difference between normal domestic production and consumption, but those necessary for recovery.

Germany is definitely working into a position where she will be able to support her own economy and contribute to the economic welfare of a hoped-for peacetime world as well. Targets of mineral production for 1952 estimated on the basis of present progress are encouraging.

Labor

Mines in Germany have had no serious labor problems and are expected to have enough manpower for planned increased output. Although labor shortage has been a factor in smelter production, it is now disappearing as a result of currency reform.

Under Hitler, miners profited by extension of social services. Mine-owned housing was increased markedly, and cafeterias, recreation rooms, change-houses equipped with sun lamps and mud baths were installed. Facilities which have not been bombed out are still operating. Extreme postwar economic adversity has pushed labor-management problems into the background for the present. Both are engaged in a bitter struggle for survival.

Political and trade union pressure in western Germany, particularly the British zone, for nationalization of coal and steel has been strong, but other forms of mining generally have not been mentioned. Mining and smelting will also be effected by de-cartelization where operated by large combines.

Germany is traditionally in the deficiency column, not in terms of her over-all resources, but in relation to her advanced industrial consumption. Virtually all mineral deposits are marginal because of intense exploitation for two wars in the past 25 years, and because many orebodies have been mined for centuries—in fact, lead-zinc mines in upper Harz Mountains were worked as early as 968. Therefore, there is little opportunity for further large-scale exploitation except ores of still lower grade.

Because of the tendency to overextend and subsidize mining during war, a difficult readjustment problem exists. One school of thought wants to continue intense sub-marginal mining to save foreign exchange. However, because most of western Germany's mines need temporary subsidies when world prices are low, it is considered sounder to rule out permanent subsidies in favor of transitory ones in accordance with normal peacetime practice in Germany and elsewhere in Europe.

Mines in Soviet Zone

Despite the "iron curtain" which divides Germany into two hostile camps, preventing normal exchange of materials, only small amounts of non-ferrous metals have entered in inter-zonal barter deals, and then only sporadically. Because of the geographical distribution of resources, the east-west split has not caused as serious a dislocation for western Germany's mineral economy as might be expected. However, the Soviet zone does include the following: (1) Germany's richest deposits of lead and zinc, and undismantled smelters and refineries in Upper Silesia. (2) Germany's only copper mines of consequence in the Mansfield slate deposits in the Harz Mountains. Smelters at Mansfield handled about 800,000 tons of dressed ore with a 2.5% metal content in prewar years. Considerable quantities of sulphuric acid, and minor amounts of silver, lead and nickel were produced here. (3) The ancient Erzgebirge area in Southern Saxony near the Czech border where Soviet forced labor is reported to be mining tremendous quantities of extremely low-grade uranium ore for shipment to unknown destinations. (4) Seventeen potash mines east of the Harz Mountains, having an annual productive capacity of 1,217,100 metric tons K_2O. (14 mines having an annual productive capacity of 709,600 metric tons K_2O lie in the American, British and French zones.)

The Soviets have also dismantled aluminum, magnesium, nickel, copper, zinc primary and secondary smelting and refining plants. Greatest loss is the modern electrolytic zinc plant at Magdeburg, which had a capacity of 60,000 tons per year.

Equipment

As western Germany manufactures considerable mining equipment, she does not need to import. In fact, occupying powers are reducing export orders so that urgent requirements of domestic mines can be met. Much of Germany's mining is open pit. Consequently she had

been a strong producer of such equipment. Germany was also Europe's largest manufacturer of flotation equipment, and her own lead and zinc concentrators are well equipped. Smelters and refiners are not outstanding with respect to modern equipment, although Germany is unique in its processes for complex smelting of copper and tin-bearing residues and roasted pyrite. She has plants still intact which can handle huge tonnages of inferior scrap, slag, matte, scoria, etc., which normally would be rejected in other countries. She leads the world in the utilization of waste and in extraction of byproducts. For example, gold and silver mining ceased in Medieval times, but considerable amounts of both metals are produced yearly from electrolytic slimes. However, self-sufficiency is not attained.

Iron Ore

Whether or not to shift from heavy imports of high-grade iron ores to indigenous low-grade ores is now a key problem because of the overriding importance of Germany's steel industry. Two factors deter full dependence on low-grade ores: (1) The steel industry has been adjusted to high-grade imported ores, (2) more coal, destined to continue scarce for several years, is required to smelt low-grade ores. Nevertheless current objectives are to increase use of low-grade ores over prewar years.

The Salzgitter acid-limonite ores (25 to 30% iron, 18 to 20% silica, and about 5% lime) found near Brunswick, Lower Saxony, are most notable because they represent reserves of about two billion tons. Prior to World War II the Nazis established five modernly-equipped mines (open-pit and underground) which during the war produced about 6,000,000 tons of ore annually. Output now runs about 2,500,000 tons per year. Although never completed, the Salzgitter steel works was destined to be one of the largest in Europe.

Facilities for loading and hauling ore from Salzgitter over the 250-mile route via Mitteland canal to the heart of the Ruhr are good. But the washed ore represents a wasteful transport burden, hence it would be better to sinter the ore before shipment. However, six of the eight blast furnaces in the steel works are earmarked for reparations, thereby reducing the amount of waste gas for sintering. This is typical of the dilemmas confronting the occupying powers.

During 1942, shipments of ores to the Ruhr from west, central, and south Germany were as follows: From Salzgitter, 2,620,020; Siegerland, 942,435; Lahn-Dill and Vogelsberg, 594,697; Taunus, 152,099; Waldeck, 702,066; Thüringer, 71,881; Baden, Bayern, and Württemburg, 998,590. Total was 6,081,738 tons.[2]

Other noteworthy low-grade ore deposits are the manganiferous types. Best ore of this type comes from the Siergerland district, which includes five mines in the French zone and four in the British. Roasted ore contains about 54% Fe and 8% Mn. Prewar production was about 100,000 tons a month; present production, 60,000 tons. The mines are very deep, costly to operate and offer little hope for expansion. Reserves are estimated at 20 years. The Peine deposits, in lower Saxony, yielding ore with 24% Fe and 2 to 2½% Mn also have reserves of 20 years, but offer little opportunity for further development. The self-fluxing ore is used by the Illseder Steel Works at Peine, which has lowest production costs in Germany.

The bi-zonal area recently concluded a trade agreement with Sweden providing for delivery in 1949 of 3,400,000 tons of ore, concentrates and pyrites. In return, Sweden is to receive 125,000 tons of steel, iron and other products in 1949. The bi-zonal economic administration had hoped to get 5,000,000 tons of ore.

Aluminum

Although entirely dependent on imported bauxite (1,200,000 tons in 1938), Germany produced 165,000 tons or 28.5% of the world's output of aluminum in 1938. Under terms of the Potsdam Agreement, Germany's aluminum industry was to be removed as a prime war potential. But deterioration of four-power control, consequent failure to attain economy unity and thus the need for heavy U. S. subsidy of western Germany led the western powers to ameliorate the policy and allow aluminum production on a provisional basis, i.e., utilization of existing stocks of alumina and bauxite. The current import program is a tacit indication that aluminum production is to continue, but undoubtedly subject to control.

Present capacity for making alumina is 220,000 tons per year, and for aluminum, 75,000 tons. However, because of seasonal availability of hydroelectric power and other factors, the effective aluminum capacity can be placed at 60,000 tons per annum. After meeting this requirement plus 35,000 tons of alumina for the chemical industries, there would be at least 60,000 tons of alumina available for French zone plants and probably for Austria, providing maximum effective capacity can be attained by the target year of 1952. A further 20,000 tons of alumina per year would be possible with repair of damaged alumina plants.

Magnesium

Production of primary magnesium is prohibited and has not been reactivated on a provisional basis like aluminum. Western Allied officials feel confident, however, that prohibition is due for repeal.

The bi-zonal area now has 1,000 to 1,300 tons of pure magnesium and about 4,000 tons of scrap (2,500 tons magnesium content). However, unless primary magnesium production is permitted, imports must be started in 1949 to meet industrial requirement.

Germany is rich in magnesium and potassium salts, and an exporter. Although some of the mines are in the Soviet zone, remaining mines in the western zone can supply magnesium producers without difficulty if production is authorized.

Germany uses from 6,000 to 7,000 tons of magnesium yearly for strictly peacetime purposes. Since the western zones have a capacity of 5,000 tons per year at Herringen, loss of the Soviet capacity is not a major problem. Soviet zone magnesium plants, largely dismantled, use the dolomite process instead of salts as in western Germany.

Lead and Zinc

Lead-zinc deposits in the Western zones are low grade. The British zone contains the most important deposits which it is currently estimated will produce about 70,000 tons of recoverable zinc and about 55,000 tons of lead annually by 1952. The bi-zonal area will have 140,000 tons of lead smelting capacity and 180,000 tons of zinc smelting capacity. If it were not for the coal shortage, the western zones could process concentrates for the neighboring countries as smelting capacity will probably exceed industrial consumption for several years.

Greatest interest now centers in the lead-zinc deposit in the Rhineland known as the Maubach development, where Stolberger Zink, AG,

[2]Lance, Iron Ores of Germany, Journal of Iron and Steel Institute, London, Aug., 1947.

holds a concession containing a million tons of proved metal and vast unproven reserves. Planned capacity, which is scheduled for completion in 1952 providing capital can be raised, would provide 20,000 tons of lead and 8,000 tons of zinc per year. Although containing only 3% Pb and 2% Zn, the development would be on a par with other west German mines. It would probably require a subsidy periodically.

A pilot flotation plant is now under construction at Gey, seven miles southwest of Düren. It is expected that the experimental plant will produce about 700 tons of concentrates per month (⅔ Pb, ⅓ Zn) by the end of 1948. Cost of construction was placed at 1,500,000 marks* prior to the recent currency reform. In addition the Maubach development will require a capital outlay of 12,000,000 marks. Stolberger Zinc, AG, one of Germany's largest combines in the non-ferrous metals industry, is seeking a means of raising this capital. The Otto Wolff syndicate has a 55% holding, and as Otto Wolff is now in the process of de-cartelization, the financial picture of the venture is further complicated.

Copper

Recoverable copper content from German mines is negligible. In 1947 it was only 239 tons. The famous Sontra mines in Hesse, with a copper content of 0.2 to 0.5%, are flooded and the smelting plant has been dismantled.

Nord Deutsche Affinerie, Hamburg, produced 80,000 tons of refined copper per annum in prewar years, of which 40,000 tons consisted of refining capacity for imported blister copper. War damage cut the electrolytic capacity of the plant to 30,000 to 40,000 tons. Production will be at the rate of 5,000 tons per month by the end of 1948.

NDA received raw material from: (1) Cyprus in the form of copper-bearing pyrite from which it produced 18,000 tons of copper per year, and (2) scraps and residues for which it has a capacity for producing 22,000 tons of metal. Both materials were converted to blister copper for refining in the electrolytic plant. NDA has been operating under a contract with the British Ministry of Supply, which provides that the Ministry, in return for supplying concentrates, was to receive 90% of the copper, the remaining 10% to be retained by NDA to cover smelting losses and to sell to the German economy.

Two other copper refining operations are the Hochofenwerke in Lubeck (Ruhr), which treats copper bearing residues from Denmark and formerly from the Soviet zone and has a capacity of 400 tons of electrolytic copper per month; and Kayser-Luenen (Ruhr), which treats copper and scrap and has been producing at the rate of 8,000 tons per year. Output will be doubled soon.

*Presumably based on the then prevailing rate of 40c. (U.S.) per mark.

Miscellaneous Minerals

Graphite. Bavarian deposits, in the Munich area, are yielding enough to meet western Germany's current below-normal requirements and allow some exports. In 1947 output was 15,244 tons of rough and 4,930 tons of pure graphite. Output for the first six months of 1948 has been 11,087 tons of rough and 3,170 tons of pure.

Talc. Western Germany gets sufficient talc for present needs from mines near Bayreuth and Amberg in Bavaria. In 1947 Bavarian mines yielded 15,443 tons of ore containing 80% talc. Production for the first six months of 1948 was 9,045 tons, of which 8,968 was pure talc.

Fluorspar. Germany has always been a leading producer and exporter of fluorspar. Mines in the Bayreuth-Amberg district produced 19,235 tons in 1947, and are expected to produce 30,000 tons in 1948. Half the output will be available for export. Other deposits are mined in the Harz, the Stolberg, and Black Forest areas in western Germany, and the Erzgebirge and Thüringian forest in the Soviet zone.

Germany's important metal and mineral deficiencies include nickel, tin, magnesite (obtained chiefly from Austria), cadmium, industrial diamonds and mica.

Unique Technical Practices

Among the unique technical practices disclosed during postwar investigations by British and American intelligence workers are the following:

1. A light-weight rock drill fitted with telescopic pneumatic leg. Water enters the drill steel through an external shank water-feed instead of passing through a water needle in the drill. This type was used with Widia tungsten-carbide bits at Erzbergewerk, Rammelsburg.[3]
2. The use of shaker conveyors to backfill inclined stopes in the Rammelsburg mines.[3]
3. A system of "pneumatic stowing" for backfilling stopes at Rammelsburg. Special blowers are used to transport dry materials up to 2 and 3 in. through pipes, packing the material right up to the stope back. Filtering and water disposal are no problems as in hydraulic back-filling systems.[3]
4. A froth destroyer in which flotation froths enter a machine by falling vertically onto a horizontal disk rotating at 300 rpm. Wire mesh is attached to the periphery of the disk to form a basket. Centrifugal force throws the pulp through the screen, after which it is collected in the housing of the unit and pumped to thickeners.[3]
5. The use of $KClO_3$ plus sawdust and petroleum as an explosive in potash mines.[4]
6. A boring machine which drills horizontal holes 1.5 meters in diameter and 20 meters long in salt mining operations. Potash mines also intend to use this device for exploration.[4]

[3]British Intelligence Objectives Sub-Committee Report No. 654, Item No. 21.

[4]Final Fiat Report 1045, Office of Military Government for Germany (U. S.).

No. 2—AUSTRIA

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AUSTRIA CAN SUPPLY a number of ECA countries and provide something for U. S. stockpiling out of exportable surpluses of magnesite, graphite and talc. Rehabilitation requirements for these mines are minor. The country's overall mining economy, however, is in a depressed state due to its unenviable postwar political predicament. ECA can provide only partial relief for these ills and then only in the part of Austria under western power control.

An unfortunate fuel situation overshadows all other mining problems. Whereas Austria should be exporting petroleum from the rich Zistersdorf oil fields, she has to request over $8 million for petroleum products under the July 1, '48, to

AUSTRIAN MINES NEED EQUIPMENT AND CAPITAL

FUEL SHORTAGES, LACK OF FINANCING AND SOVIET ANTICS clutter up Austria's difficult road to recovery.

June 30, '49, ECA program because the Soviets have a stranglehold on these resources through an extreme and unreasonable interpretation of what constitutes German assets.

Bonafide German assets were subject to seizure and removal as reparations. Since oil wells can't be removed, the Soviets are making the most of them by wasteful, wildcat exploitation. The Austrians get only a meager allotment which is always subject to cancellation. It is estimated that Austria could be realizing up to $20 million yearly in foreign exchange on oil exports.

Austria hasn't been able to obtain sufficient hard coal from her traditional sources, the Ruhr and Silesia. She has only one hard coal mine of any consequence and it happens to be in the Soviet zone.

Austria should be self-sufficient in iron ore, except for high Mn content ore for special requirements. However, the iron ore mines in Styria lack equipment for getting maximum output in large part due to Soviet removal of haulage and transport equipment.

Prewar output was about 10,000 tons daily, whereas it has been running about 3,200 tons. Most of the decrease is directly attributable to the removals. Required equipment, for which about $425,000 will be allocated out of the '48-'49 ECA budget, includes locomotives, electric dredges, loading equipment and spare parts. It is hoped to raise present production level by 50%.

It will be necessary to import 400,000 tons of iron ore during the '48-'49 period. For production of special kinds of pig iron, 20,000 tons of manganese ore is scheduled for import, half from Hungary and half from British India.

Non-ferrous metal mining is handicapped by a woeful lack of working capital necessary to take care of wartime depreciation. The Austrian government is financially unable to provide subsidies and long-term credits for this purpose and all needs cannot be met out of ERP. Some mines have been so short of working capital they've been unable to meet payrolls and have either had to shut down or haven't reopened since the war.

All production figures since end of hostilities have shown violent fluctuations. This has been due chiefly to irregular availabilities of coal and power. And in some cases it has been due to inability to produce minerals in marketable form.

About $300,000 has been earmarked for equipment for non-ferrous metal and mineral mining rehabilitation. Much will go for spare parts throughout the industry. Other items include steam shovels for loading magnesite, deisel locomotives, conveyor equipment and items for talc and graphite milling and processing.

The Austrian Ministry of Mines already has ordered from the U. S. $250,000 worth of drilling equipment for prospecting. The government hopes to explore what are believed to be worthwhile non-ferrous orebodies as well as more oil and perhaps coal areas.

Fortunately, the mines producing the three major export items—magnesite, graphite and talc—are in reasonably good condition. Their chief requirement is for rehabilitation of processing facilities.

Magnesite

Magnesite ranks first in importance in Austria's mineral resources. Prior to the Anschluss, she was the world's second largest producer. Production in 1945 was down to 25% of 1937 but increased to 56% in 1947. About 40% of dead-burned magnesite went to the U. S. in 1937, with 24% to Britain, 13% to Germany. Britain, France and Germany took more than 50% of the brick exports.

Austria will count heavily on its magnesite for foreign exchange and it has already helped its non-dollar trading position (barter or clearing arrangement) within the ERP orbit and its eastern neighbors. Mines are well equipped.

Two foreign-financed firms are dominant in Austria's magnesite industry. One is the Austro-American Magnesite Co., at Radentheim, Carinthia and the other is the Veitscher Magnesite Co. at Veitsch in Styria. Both are in the British zone.

The Austro-American Magnesite Co. is owned by the American-

Austrian Magnesite Corp. of Pittsburg. Workings are located in the Millstaetter Alps, northwest of Villach and about 5,000 ft. above sea level. Sintering and brick making plants are located at Radentheim, six miles south of the deposits and about 3,000 ft. lower.

More than 50% of the shares in Vietscher Magnesite Co. are owned by Magnesia, SA of Switzerland. Another 25% of the shares are held by the Laender (State) Bank in Vienna. This company operates three mines. The largest, as well as the oldest-worked deposit in Austria, is located at Veitsch, five miles north of Mitterdorf. The deposite forms a hill known as Sattlerkegel and the workable mineral, which extends for about one mile with a width of nearly 500 yds., has been explored by means of an adit to a depth of 700 ft. below the top of the hill. It is estimated that reserves above this level are sufficient to last more than a century.

Graphite

Austria's graphite deposits, although not of highest quality, could be exploited more profitably. Mining capacity would be sufficient at present to provide exports well beyond U. S. industry's import requirements. Further mining developments also are possible.

Production in 1937 amounted to 18,158 metric tons, of which 69% was exported. Output was 3,485 metric tons in 1945 but the following year dropped to only 254 because of lack of foreign markets and domestic demand. In 1947 tonnage went back up to 3,845. The 1948 goal is to mine a minimum of 10,000 tons, and thus requiring quantity export sales.

Graphite mines in the western zones need some equipment under ERP, notably drying kilns, compressors and some equipment for grinding and refining. Other deposits considered worthy of exploitation exist in the area of Wappoltenreith in Lower Austria (Soviet zone).

The Styrian (Steiermark) graphite deposits are found in a belt, 30 miles long running from the famous mining town of Leoben to Rottenmann, west of Trieben. The two companies operating in this region are: (1) Mayer-Melnhof'sche Mountain Works, which operates the Kaiserberg mine at Kaiserberg, near Leoben. (2) A. R. Millers Graphite Works, which has the Hohentauern mine at Sunk, south of Trieben. Both firms are Austrian-owned.

Austrian Mine Production

(In metric tons)

	1947	Jan.-July, 1948, Incl.
Antimony	2,235	3,222
Barite	1,943	1,516
Calcite	3,014	1,180
Copper ore	17,085	23,289
Feldspar	951	631
Graphite	3,845	6,600
Iron ore	884,936	696,597
Lead, zinc, molybdenum ore	50,697	50,863
Magnesite	223,117	213,682
Mica	1,275	915
Pyrite	6,129	3,785
Quartzite and quartz sand	36,217	25,190
Talc, talc shale	24,490	25,394
Gypsum	666	not reported

Deposits in Lower Austria are in the Muehldorf district and in the Dunkelsteiner Forest on the left bank of the Danube. Active in graphite production are: (1) Muehldorfer Graphitbergbau, AG, which works mines at Muehldorf, (2) Erzhuette, AG, which operates mines at Persenbeug on the Danube.

Austrian graphite is especially suitable for application in the metallurgical industries. For example, it makes a good flour for powdering forms in foundry operations. It is also a good refractory material.

Average Analysis of Austrian Graphite:

Carbon content	40-70%
Loss at red hot temperature	45-75%
Sulphur content	1-0.3%

Analysis of Remaining Ash:

SiO_3	57%
Al_2O_3	31%
Total Fe	4%
CaO	1%
MgO	2%
K_2O	4%
Na_2O	1%
	100%

Copper, Lead and Zinc

Austria is unable to cover her own requirements in copper, lead and zinc when normal industrial consumption prevails.

Only copper being mined is at Mitterberg in Land Salzburg (U. S. zone). This is a low-grade ore with a recoverable metal content averaging 2.2%. In 1947 ore output amounted to 17,085 metric tons, but for the first seven months of 1948 it had reached 23,289. Another copper mine at Silberberg in the Tyrol (French zone) is inactive.

Sole copper smelting capacity is Brixlegg in the Tyrol, to which the concentrates from Mitterburg's flotation plant are now being shipped. Brixlegg had a peak output of 350 tons of electrolytic copper per month, including refining of scrap. The plant, however, has suffered considerable war damage which hasn't been repaired completely and it has been unable to process even the full domestic output of concentrates. During the second half of 1947, the plant produced only 310 tons of electrolytic copper, but in the first seven months of 1948 has produced about 1,000 tons.

Austria's normal copper consumption is rated at 15,000 tons per year. Under the '48-'49 ECA program, an import of 10,000 tons is requested.

Lead-zinc-molybdenum ore deposits around Bleiberg in Carinthia, which lie in disputed territory near the Yugoslav border, are also Austria's only source of these materials being worked at present. In 1947 ore output amounted to 50,697 metric tons but in the first seven months of 1948 tonnage exceeded 50,000. Estimated monthly maximum output has been placed at 10,000 tons.

Zinc concentrates from Bleiberg's flotation plant are being shipped mainly to Belgium, whereas before the war only about half went there and the rest to Czechoslovakia. Zinc concentrates shipped out in 1947 amounted to 2,458 tons.

It has been proposed that a zinc smelter be established with the help of ERP but no requirement has been submitted under the '48-'49 program. Domestic smelting capacity apparently is justified because output of concentrates could be much higher than at present.

Bleiberg has its own lead smelter, with a capacity of 12,000 to 15,000 tons of soft lead per year. Besides processing indigenous ores in 1947, the smelter handled Italian lead concentrates. Total output in 1947 was 3,795 tons.

Under the '48-'49 ECA program, Austria is requesting 3,000 tons of lead to augment her domestic output and 7,500 tons of zinc.

Antimony deposits are found in Lower Austria, and hence under Soviet domination. Output in 1947 amounted to 2,235 tons and in the first seven months of 1948 reached 3,222 tons. The mines have a rated capacity of about 1,800 tons per month.

Mica

Austria's mica deposits appear to offer a good field for investment. The biggest mine, near St. Andrea in Carinthia, has had to shut down for lack of working capital. Its

production has been fluctuating badly in the past year.

The principal need of this mine and others is for processing equipment needed to produce sheets, powdered and other forms of marketable mica. It is estimated that the mine at St. Andrea could become a first class producer with a capital outlay of about $300,000.

Talc

Talc has already become a sizable postwar export commodity. Principal deposits are in the Alpine regions of Styria and smaller deposits are mined in the Tyrol and in Land Salzburg.

Prewar Austria ranked as one of the world's leading talc producers. Her 1937 production was 17,090 metric tons. Because of urgent demands, a high priority has been given to the mines with the result that in 1947 production reached 24,490 tons or 114% of the 1946 figure and was 144% of 1937.

Aluminum

The war left Austria with tremendous primary aluminum capacity but completely dependent on imported alumina. This was the result of the Germans establishing, but not completing, Europe's most modern plant at Ranshofen. It was designed for an annual production of 65,000 tons but highest output achieved was 36,000.

The plant was set up as an adjunct to the Schwandorf alumina producing plant in Bavaria, which also supplies Toeging, now western Germany's principal aluminum producer.

Austria's only prewar aluminum plant was at Lend, a subsidiary of the Swiss firm AJAG. It had a prewar capacity of 4,000 tons per year and was expanded under the German occupation to provide an output of 7,000 tons. It has its own hydroelectric power plant.

Both plants have operated intermittently since the end of hostilities because all hydro power, including the output at the Lend plant's own station, has had to go into the Austrian grid for federal distribution. Highest monthly output for the Ranshofen plant was 1,926 tons in July, 1948. Highest monthly output at Lend was 468 tons, also July, 1948.

Lend is supplied alumina by its parent company in Switzerland. Ranshofen has been occupied primarily with contracts for processing French alumina.

Nationalization Is Lukewarm

The present pattern of ownership in Austria is confused and unsettled. Postwar legislation provided for public ownership of certain enterprises but not for broad industry-wide nationalization in the accepted sense. The legislation represents a compromise between the two major parties, the right-wing People's Party and the left-wing Social Democrats.

Thus we find about 60% of the coal mines under public ownership and about 90% of iron-ore mining as a result of the huge Alpine Montan steel firm in Styria becoming state-owned. However, the individual enterprises are still managed as before, with the government merely becoming a stockholder. Compensation is assured but the poor financial condition of the Austrian government has prevented anything being done along this line.

Those enterprises which are bona fide German assets also have been taken over by the government under a trusteeship arrangement, which was worked out between the Austrian government and the occupying powers which have title and control until a peace treaty is signed. The trusteeship arrangement commonly leads to the erroneous idea that all German assets enterprises have become public property. Some eventually may be made so but not necessarily.

It is noteworthy that enterprises with important foreign holdings, other than German, have not been brought under public ownership. Although not by design, public ownership has not effected any magnesite, graphite or talc mining.

At best, Austrian nationalization is a lukewarm affair. It was a more or less hasty compromise to meet the inevitable swing to the left of labor groups discontented with their postwar economic conditions. Many Allied observers feel it has spent its course unless a serious economic depression swings Austrian politics to the left.

The Soviets in most cases have taken ownership into their own hands under the German assets guise and have no use for the mild brand of nationalization practiced by the Austrian Social Democrats. A question mark, of course, also hangs over what ultimately will happen to properties confiscated by the Russians and operating on Austrian soil. It is one of the basic issues preventing a four-power agreement on an Austrian peace treaty.

No Labor Problem

The Austrian mining industry has no real labor problem. Its production bottlenecks stem chiefly from the condition of mining equipment and processing plants and the ill effects of the country's tangled political situation. Mining enterprises in Austria generally aren't large enough to create important social problems that would lead to major unrest. The average Austrian miner is like the average peasant. He is wedded to his environment by tradition and has come to expect ups and downs in mining just as he expects seasonal variations in farming.

No. 3—ITALY

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Rome, Italy

ALONG WITH OTHER NATIONS of Europe, Italy, too, is trying to untangle a war disrupted economy, and set her house in order. Because of natural discontent due to scarcities, poor living conditions, inflation, etc., laborers have shown tendencies to sympathize with left-wing philosophies, particularly those workers suffering severest privations. But socialism and communism for the uneducated masses are but means of expressing discontent with existing conditions. Should reasons for discontent be removed, socialism and communism will rapidly lose ground. Hence Italy looks to ECA to supply the leaven that will ultimately sway the workers to conservatism. These overall conditions in Italy are reflected in various phases of the mining industry as will be revealed in the following discussion.

No Nationalization

Nothing has been done to nationalize or socialize the Italian mining industry. The control exercised indirectly by the State over several Italian mining groups is not the result of a policy of nationalization, but rather due to the need of salvaging industries which otherwise would have to suspend work. The present policy of the State is to discontinue these controls. This

will, of course have to be done gradually because of opposition offered by left-wing parties.

Some attempts have been made recently to run mines on a cooperative basis in Tuscany, first in the Mugello area, and then near Sienna, and more recently at Valderno, in the province of Grosetto. However both industrialists and the workers federations agree in considering these undertakings doomed to failure.

Labor Is Plentiful

Skilled labor in Italy is plentiful (there are at present 2,000,000 unemployed in the country—25,000 in the mining industry). Efficiency of workers on the whole is high despite excessive living costs which generally prohibit the diet required for hard mining work.

Because of discontent with existing conditions and wages, the majority of Italian miners are members of, or sympathetic with left-wing parties. They should not, however, be classed as communists because their present leanings toward socialism or communism will diminish rapidly if existing conditions improve. In general, all in Italy who work under normal conditions and have adequate salaries are substantially conservative. In general productivity of workers was lower in 1947 than in 1938. This is largely due to deterioration of plant facilities, inadequate transportation, drastic reduction in the demand for ores on the Italian market brought about in the second half of 1947 by Einaudi's deflationary policies and credit restrictions. However when compared with 1946 figures, there has been considerable improvement. The only ones which are slow to show recovery are the Sardinian lead-zinc mines, and the sulphur mines of Sicily.

Italian mining companies have so far done little in the way of social welfare work. Those improvements which have been introduced such as provision for transportation for workers from their homes to the mines have been obtained only after hard-fought struggles with unenlightened employers. Hardly anything has been done in Italian mining centers to provide vocational training, for which a need is keenly felt in Sardinia. There is still a great need for hygienic conveniences for men in the mines such as showers, etc., and above all for housing for men and their families. Unhealthy lodgings, lacking in sanitation facilities, where a whole family is crowded into one room and

KEY TO MINERAL MAP*

Mineral or Plant	Symbol	Location
Mercury Mines	HG 1	AB. S. Salvatore
	HG 2	Idria
	HG 3	Carpine Solforate
Bauxite Mines	AL 1	Istria
	AL 2	Gargone
	AL 3	Benevento
Alumina Plants	AL 4	Porto Marghera
	AL 5	Porto Marghera
	AL 6	Porto Marghera
	AL 7	Bussi
	AL 8	Civitavecchia
	AL 9	Treviglio
Aluminum Plants	AL 10	Bolzano
	AL 11	Mori
	AL 12	Marghera
	AL 13	Borgofranco
Magnesium Plants	MG 1	Bolzano
	MG 2	Aosta
	MG 3	Appuania
Antimony	SB 1	Su Suergiu (Cagliari)
	SB 2	Ballao (Cagliari)
Lead-Zinc Mines	PB-ZN 1	Monteponi
	PB-ZN 2	San Giovanni
	PB-ZN 3	Acquaresi
	PB-ZN 4	Gennomari
	PB-ZN 5	Montevecchio
	PB-ZN 6	Argentiera
	PB-ZN 7	Predil (Raibl)
	PB-ZN 8	Val Seriana
Lead Smelters	PB 9	Pertusola
	PB 10	Monteponi
		San Gavino
Zinc Smelters	ZN 12	Crotona
	ZN 13	Monteponi
	ZN 14	Porto Marghera
	ZN 15	Vado Ligure
Copper	CU 1	Sa Duchesse (Cagliari)
	CU 2	Fontana Raminosa
	CU 3	Calbana (Sassari)
	CU 4	Ollomont (Turin)
Tin	SN 1	Monte Valerio (Grosseto)
	SN 2	Canale Serei (Cagliari)
Iron Ore	FE 1	Id of Elba
	FE 2	Cogne (Aosta)
	FE 3	Nurra (Sassari)
	FE 4	Bergamo
	FE 5	Strattoia (Lucca)
Blast Furnace Plants	FE 6	Bagnoli (Naples)
	FE 7	Piombino (Grosseto)
	FE 8	Porto Ferraio (Elba)
	FE 9	Servola (Trieste)
	FE 10	Cogne (Aosta)
	FE 11	Sesto S. Giovanni (Milan)
	FE 12	Cornigliano (Genoa)
Manganese Ore	MN 1	Tre Monti (Genoa)
	MN 2	Canneto (Pisa)
	MN 3	Mt. Alpi (Piedmont)
	MN 4	Mt. Argentario (Grosseto)
	MN 5	San Pietro (Cagliari)
	MN 6	Bosa (Sassari)
Asbestos Mines	ABS 1	Comune di Lanzado Prov. di. Sondrio
	ABS 2	Comune di Balangero Prov. di Torino
Graphite Mines	GR 1	Comunes Chisone Perosa Pinasca, Argentina E S. Germano, Prov. Torino
	GR 2	Comune di Murialdo Prov. di Savona
Sulphur Mines	S 1	Caltanissetto Area, Sicily
	S 2	Enna Area, Sicily
	S 3	Agrigento Area, Sicily
	S 4	Pesaro Area, Bologna
	S 5	Ancona Area, Bologna
	S 6	Forli Area, Bologna
	S 7	Avellino Area, Naples

*Map and list adapted from material prepared for U.S.B.M. by U.S. Tariff Commission, Oct., 1943.

SURFACE PLANTS AND CONCENTRATORS of lead-zinc mines like this at Miniera di Montevecchio are generally excellent.

UNDERGROUND, LEAD-ZINC MINES like this in Sardinia could be improved with the installation of mechanical loaders.

a kitchen are common in almost all of the mining centers of Sardinia, Sicily, Tuscany and the Marches.

Mechanization

In general Italy's mining industry is far from being fully mechanized. Diamond drills, rock drills, electric drills and tungsten carbide bits are commonly used, but mechanical loading equipment underground is lacking. Equipment in open-pit mines is also scanty.

Manufacturers of mining machinery are in a position to export limited amounts of some mining machinery such as compressors, pneumatic drills and scrapers. They also produce substantial quantities of pumps, crushers, flotation machines and other ore-dressing equipment.

Nevertheless, because of present efforts to modernize plants and cut costs it is presumed that Italian imports of mining equipment from the U. S. under ERP may exceed the 13 to 14 million provided for the first year of application. Tentatively it seems that $6 million will be used for coal mining equipment, $1 million for drilling machinery to enlarge boracic steam jets at Larderello; and $4 million for other mines chiefly for flotation equipment and conveyors in Sardinia.

Technical Help Not Needed

With relation to the possibility of American capital collaborating with Italian industry, Italian industrialists have carefully studied Section 117a of the ECA Act, and are much interested in reaching agreements with American agents for the development of strategic mineral resources vital to America.

However, apart from such special cases Italian industrialists do not believe they need technical help. Those visiting American mines expressed admiration for what they saw, but believe that it would not be economical to equip small Italian operations on the same scale. Italian engineers are capable, drawing on experience they have acquired in all parts of the world. In general, American technical help should be confined to teaching the use of new machinery imported from the United States.

General Mineral Position

In prewar years Italy was heavily deficient in iron ores, coal, petroleum, copper; steel alloy metals such as chrome, nickel, tungsten; tin and kaolin. At the same time, she had abundant supplies of sulphur, mercury, talc, pyrites, zinc and barite. Since then, the peace treaty has deprived her of important mercury deposits in Idria, of bauxite beds in Istria, and coal in Arsa, all of which have been assigned to Yugoslavia.

When the war ended prospecting for small orebodies of copper, nickel, cobalt, tin, tungsten and molybdenum ceased because existing deposits of these types could not be worked economically.

Nevertheless considerable interest now centers in deposits of leucite (more than 100 million tons) with an alumina content of 22 to 23%, and a potash content of 17 to 18% which exist in central and southern Italy. When separated mechanically and treated chemically this mineral yields potash and alumina. Although experiments carried out by Prof. Blanc to date have not given hoped-for results, it is believed that the problem will be solved.

Manganese Ores

Italy has fairly large reserves of manganese ores, but because of their low grade (15 to 40% Mn.) and frequently excessive silica (20 to 40%) they must be mixed with foreign ores or iron ores containing less silica.

Most important mines are near Grosseto and Siena in Tuscany, and in Latium and Calabria. The ores in Sardinia and in the Alps are of little consequence.

Mercury

Before World War II Italy ranked first as a mercury producer, with output coming from Monte Amiata mines in Tuscany and the Idria mines near Gorizia. Under a cartel formed with producers in Spain, Italy controlled world trade in mercury.

Although the mines in Idria which accounted for one-fifth of Italy's output were surrendered to Yugoslavia, Italy continues to be a large producer, and exports about 80% of the metal produced.

Because of the present state of the world mercury market still regulated by agreements with Spain, Spain can produce more advantageously under present prices

than Italy. Consequently, Italian exports have been held to about 600 tons in 1947, thus aggravating the condition of the industry which has stocks amounting to 78,000 flasks.

Aluminum Industry

Italy requires 150,000 to 180,000 tons of bauxite yearly. In 1947 supplies came exclusively from the mine of S. Giovanni Rotondo, near Gargano, having estimated reserves of 10 million tons averaging 56% alumina and less than 3.5% silica.

Other reserves not fully studied are in Apulia, Campania, and Abruzzi, where experts estimated that 8 to 10 million tons exist. If these deposits are worked, in due time Italy's supply of raw material for her aluminum industry will be ample, particularly if the leucite deposits can be used.

Capacity of Italian aluminum factories at Marghera, Borgofranco (Aosta), Mori (Trent) and Bolzano exceeds 48,000 tons per year of which the home market can consume 42,000 tons.

Antimony

Of the many beds of stibnite in Italy, only those in Sardinia, and near Grosetto and Siena produced in 1947. More than 60% of the output came from Sardinia where antimony content in ores ranged from 4 to 7%. Average output capacity of stibnite is about 6,000 tons per year for Italy.

Regulus, oxides of antimony and liquated antimony sulphides are produced at plants of Villasalto and Manciano (Grosetto). In addition, some 400 tons of regulus and compounds are imported each year.

Lead and Zinc

In 1947 more than 90% of Italy's lead ore and 60% of her rich zinc ore was produced in Sardinia, particularly in the area near Iglesias. Production also came from mines near Tarvisio and the districts of Bergamo and Belluno on the mainland.

Italy's present lead-zinc industry is impeded by partial flooding of the Iglesias mine and reduced capacity of smelters as a result of war operations.

Largest output of lead ore was in 1940, when production totaled 75,000 tons and resulted in impoverishment of rich zones in lead orebodies. Since then, production has fallen steadily. Even if mines were worked at full capacity, full national demand for lead ore could probably not be met out of domestic production.

Metal and Mineral Production in Italy

(Metric Tons)

	1947	Jan.-June, 1948, incl.	Consumption (Metric tons) 1938	1947
Bauxite	167,719	92,908	285,808	195,195
Antimony ore	4,448	2,234	5,219	4,408
Arsenic bearing ore	9,822	2,062	....	....
Iron ore	226,000	211,366	1,375,674	261,229
Ferro manganese ore	20,542	10,974	....	....
Manganese ore	26,768	12,266	122,040 (a)	88,806 (a)
Mercury ore	159,632	65,712	....	....
Lead ore	32,287	21,910	77,968	34,227
Zinc ore	116,169 (c)	68,597	125,721	46,794
Copper ore	529	106	27,593	529
Tin ore	None	None	494	84
Asbestos (b)	10,468	5,739	12,851	21,341
Barite	65,798	24,261	....	....
Feldspar	11,000	6,477	....	....
Fluorite	20,270	18,888	....	....
Graphite	4,151	3,530	5,683	5,556
Iron pyrite	628,799	402,715	851,865	555,686
Sulphur (mineral)	1,087,946	599,874	....	....
Aluminum metal	25,064	16,518	25,330	29,564
Copper metal	(d)	(d)	82,076	51,039
Mercury metal	1,850	719	462	1,272
Nickel metal	None	None	4,043	946
Lead metal	17,543	12,235	59,240	24,593
Zinc metal	24,077	12,211	35,531	26,690
Tin metal	None	None	5,256	2,795
Sulphur (refined)	148,432	81,075	149,353	127,269
Antimony metal	407	(d)	1,237	407

(a) Includes ferromanganese and manganese ore. (b) Fiber and dust. (c) Includes cadmium-bearing ore. (d) Not reported.

Lead ores are smelted in Sardinia. Production during 1938 to 1942 averaged 37,800 tons annually and amounted to 44,031 tons in the peak year of 1938. Average consumption for 1938-42 was 58,788 tons, leaving a deficit of 20,981 tons to be imported in the form of ores and metal.

Italy has always exported zinc ores. Average annual production for the 1938-42 period was 185,493 tons of which an average of 75,500 tons were exported yearly. Consumption of zinc for the 1938-42 period averaged 38,000 tons against an annual average production of 36,921 tons coming from electrolytic plants at Monteponi, Porto Marghera, Crotona, and Vado Ligure.

Output of lead and zinc ores is steadily increasing despite flooding of lower levels of the Iglesias mines. Demand on the domestic market was active in the first half of 1947 but fell off in the second half, and early part of 1948. Because of large unsold stocks of lead and zinc, Italian producers have requested suspension of imports, and removal of obstacles to exporting lead and zinc.

Copper

Several small low-grade copper deposits occur in the western Italian Alps and in Sardinia. Output which in prewar years had fallen to a few hundred tons per year rose to 22,586 tons of ore in 1938, and 25,000 tons in 1942. Production of ore, regulus and cement copper dropped to 529 tons in 1947. Normally, Italy consumes 60,000 tons of copper per year.

Graphite

The graphite industry has recovered markedly, producing 4,151 tons in 1947 approaching the 1933-42 average. Italian graphite is of the amorphous, low-carbon type and is produced mainly in the Val Chisone and the Ligurian Alps. Although exports of amorphous carbon are large, Italy must import crystalline graphite from Ceylon and Madagascar, for the manufacture of electrodes, crucibles, etc.

Asbestos

Short fiber asbestos is produced by S. Vittore near Balangero (Turin), and long fiber serpentine asbestos from beds near Sondria. The S. Vittore deposits, containing considerably more than 10 million tons averaging 1.5 to 3% asbestos, are mined by glory-hole methods.

Total output in 1947 was 10,500 tons consisting mostly of short fiber and dust from S. Vittore.

Talc

Talc is usually obtained from mines at Pinerole in Piedmont; the Appenines in the neighborhood of Piacenza and Parma; the upper valley of the Magra; Montenero near Leghorn; Vipiteno; and the district of Nuoro in Sardinia. Largest production was 80,500 tons in 1942, and largest exports were 22,400 tons in 1941.

THE 45 HAULAGEWAY, as seen here, may be compared with the adjacent cross-sectional drawing. Track gage is 36 in. Sixty-pound rails are laid on 6x8-in. ties, 5 ft. long, spaced 24 in. apart. The rails, in 30-ft. lengths, are welded to insure low resistance.

Driving the Grootvlei

Factors Contributing to Results Achieved With Shovel Loaders in This South African Mine

1. Introduction of a loading machine of adequate capacity made it possible to raise monthly footage to desired objective.

2. Training of all personnel directly connected with driving the haulage in the operations developed for a cycle, in the sequence of these operations and on the machinery provided.

3. Designing and building of a filter plant made it practicable to send exhaust air from the end into the mine workings.

4. Maintenance of a ventilation system which allowed the constant use of a 30-minute re-entry interval.

5. Introduction of a simple track and car-transfer layout in the face.

6. Boosting of the air pressure, which resulted in an increased loading and drilling rate.

7. Maintenance of good track conditions, which allowed rock to be transported at maximum speed without danger of derailment.

8. Maintenance of all machinery in first-class order and keeping on the job an adequate supply of spare parts for the loaders.

9. Use of 4-ton cars, which reduced car-servicing time at the loader.

10. Excellent team-spirit that existed between members of the tunneling crew and the cooperation given by other departments of the mine.

THE RECENT EXPERIENCE of Grootvlei Proprietary Mines, gold producer of the Far East Rand, South Africa, in driving its 45 Haulageway demonstrates how important the selection of equipment of the correct capacity can be if attainment of the desired objective is to be realized. In planning this development, the Grootvlei management had proposed to pull at least four 8-ft. rounds per 24 hr. in this heading, 12½ ft. wide by 10 ft. 10 in. high, or to achieve an advance in the neighborhood of 1,000 ft. per period of 26 working days. These figures were surpassed in February of this year, when the advance was 1,132 ft., 138 rounds being blasted averaging 8.2 ft. per round and the average footage being 43.5 per day. But as recently as June, 1947, the original objective had not been reached after three years of striving. In that month the advance was only 804 ft., resulting from 112 rounds averaging 7.18 ft. per round with a daily footage of 30.9.

The basic change that brought success was the substitution of a shovel loader large enough to handle the muck in a heading of this

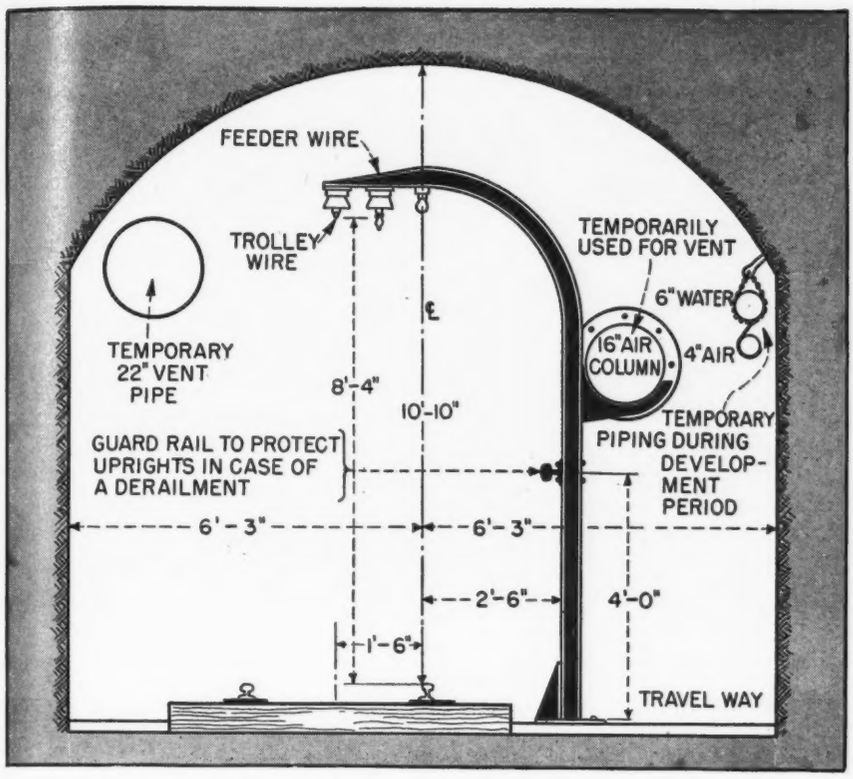


FIG. 1. IN THE HAULAGEWAY a traveling way, which is to be used by the workmen only in emergency, is to be fenced off with diamond-mesh galvanized wire 6 ft. high.

45 Haulageway

size for the loaders that had previously been doing the work. The late F. L. Van Eyssen, then general manager of Grootvlei, said in June, 1947, that the loaders available had been too small for the job, and two of them had therefore been used at the same time in the heading. This had been responsible for using a complicated track layout that caused confusion and lost time. It had led, moreover, to an inferior design of drill jumbo that restricted the working space and made the drilling time in the cycle too long. Also, the high maintenance required for the loaders as a result of their being too small had caused an excessive number of lost rounds.

Despite this, the management believed that the principle of using shovel loaders was correct in that they clean from the back of the pile towards the face and drilling cannot begin until the round has been completely mucked. Thus the tracks are always up to date and there is no difficulty in keeping the heading on grade. The loader, however, should preferably be of the type which loads onto a conveyor belt which can hold enough dirt to enable it to go on working while the car is being changed. It should be able to load 3 to 4 tons per minute comfortably.

Track layout, moreover, should be simple and only a single track should be carried to the face. The management believed also that the use of a jumbo was correct in principle but that its design should provide sufficient working space between the carriage and the sidewall.

The result was that in September, 1947, the Grootvlei management substituted a larger loader with a built-in conveyor, a Model 40 Eimco, for the Model 21 machines of the same make which they had been using. It should be borne in mind that the smaller loader was the largest available on the Rand at the time it was adopted. The management also simplified the track layout and redesigned the jumbo. These changes made, they soon attained their objective and went beyond it, as has been shown.

Rapid transportation of men to a hitherto unexplored and undeveloped part of its holdings was the principal aim of the management in driving the 45 Haulageway. It was to be equipped for handling material and ore as well. A cross-sectional drawing and a photograph demonstrate the features of construction. The rolling stock provided was: 20-ton trolley locomotives with a top speed of 26 mph., 10-ton Granby cars, 30-passenger man cars, and flat cars for transporting material. All the rolling stock is equipped with air brakes.

During the development period it was decided to use 4-ton Granby cars and 4-ton storage battery locomotives for transporting ore. These are still in use because of delay in delivering the 20-ton locomotives ordered.

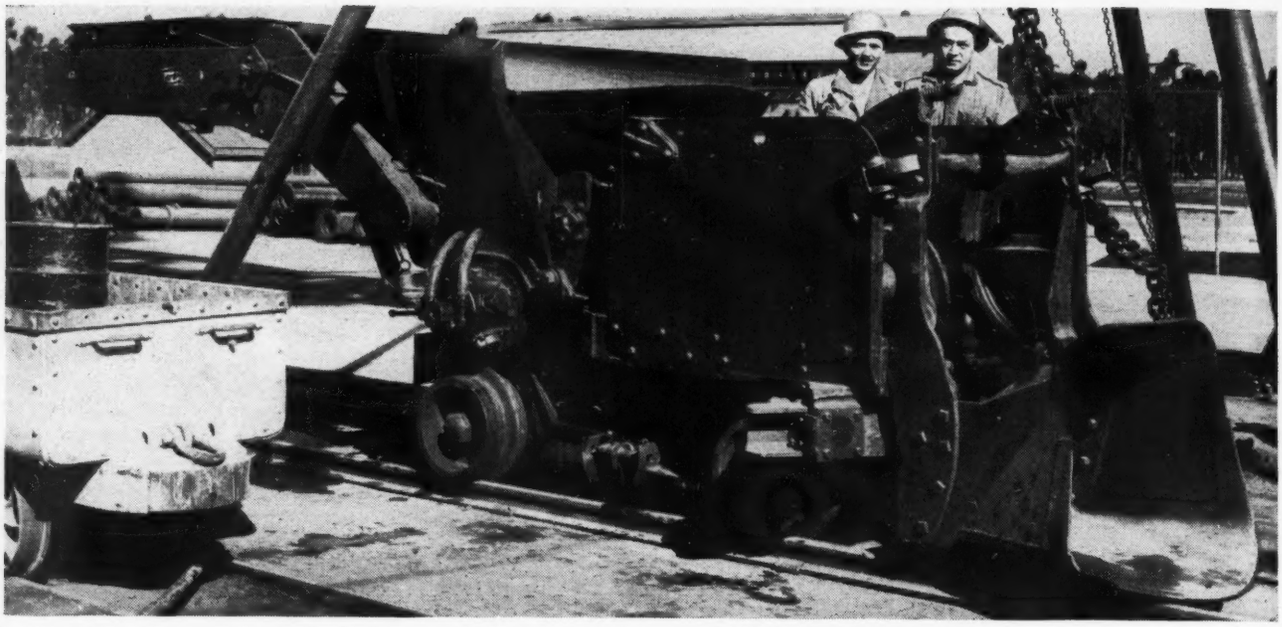
The First Period

In driving the haulageway, the drilling was first done with drifters mounted on the original jumbo. Holes were 9 ft. long, drilled with sharpened 1⅛-in. hexagon steel, maximum starting gage being 1 13/16 in. A 38-hole drag round was used.

At the time when the possible use of a jumbo was being considered, it had seemed preferable to use a shovel loader rather than a scraper slide. The Model 21 Eimco loaders mentioned were bought, one to serve as a spare. They did good work. The 8-ft. round was mucked in about 3½ hr., giving three 8-ft. rounds per 24 hr., but only three. If one shovel was out of commission, only two rounds could be obtained.

Operation of two loaders at the same time in the face had a detrimental effect on drilling and track laying. A double track of 45-lb. rail was carried in advance of the permanent track of 60-lb. rail, with a symmetrical California switch between the two sections. The switch was kept 40 to 50 ft. from the face and pulled forward daily by the loaders. Derailments were frequent with this switch when the locomotives pushed the cars across it. This difficulty was overcome by towing the empty cars across the switch with a loader. This necessitated the absence of the loader from the face for long periods and called for extra manual labor.

When the 45-lb. track layout had attained its maximum length of approximately 400 ft., the rear switch crossover was moved forward 120 ft. and the permanent 60-lb. track was extended the same distance. This was done while drilling was under way and took about two hours. The track was moved in 120-ft. lengths, these being joined



SUBSTITUTION of this shovel loader for two smaller loaders used in mucking haulageway resulted in attainment of Grootvlei's objective.

ONE OF TWO SMALLER LOADERS used until mid-1947 in mucking out 45 Haulageway.

by fishplates temporarily until electric power was available for welding.

Difficulty of Jumbo Design

Design of the drill jumbo was in turn dictated by the track layout. The first jumbo tried was built to work on an 8-ft. gage and it ran on the two outside rails A and B (Fig. 2). It was designed to permit cars to pass. During the mucking period it stood over the California switch. As it turned out, it was difficult to maintain track centers accurately and here again much time was lost through derailments. The design, moreover, did not allow enough room between the jumbo and the side walls for the drillers to work in comfort. Confusion resulted and time was lost.

The next step was to cut the jumbo in two, each adapted to 36-in. gage and mounting four drifters. This change eliminated derailments but the jumbos still did not allow enough room for the drillers.

Blasting was done with fuse and 60% ammonia dynamite in 1¼-in. sticks. Approximately 2 ft. advance was obtained per case of explosives used on the job.

With the procedure and equipment described, the best month's performance was obtained in August, 1947. Table II gives the figures, together with the details of the operating cycle. All footage was in quartzite. Total crew for 24-hr. operation allocated to 45 Haulage included 21 Europeans and 109 natives.

The New Loader

From May to September, 1947, three of the Model 21 loaders were available. Early in the latter month, the Model 40 loader was installed. Thereafter the three small loaders were kept in reserve.

Investigation into methods used

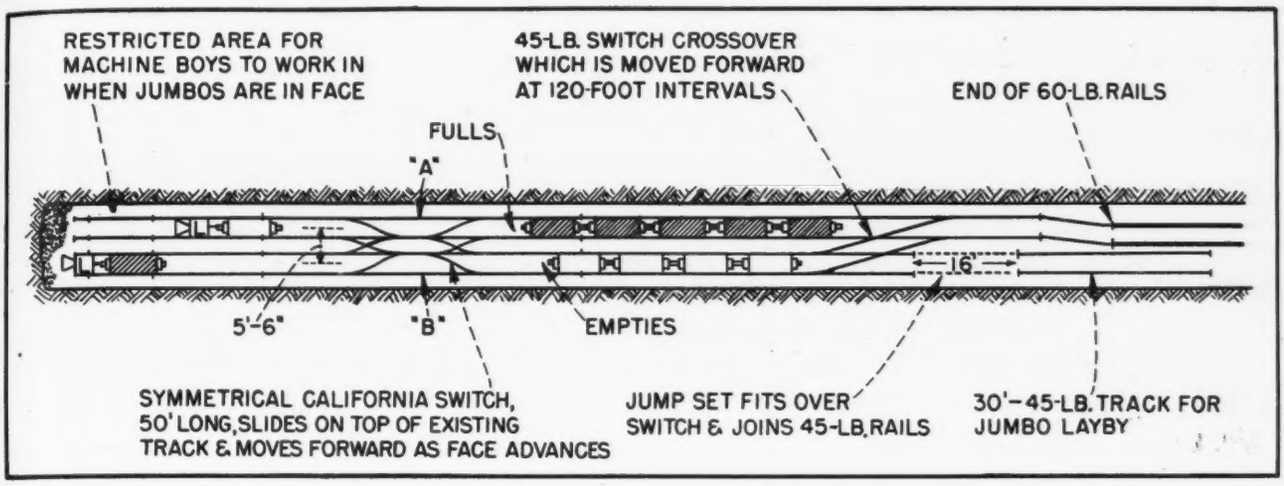

RESTRICTED AREA FOR MACHINE BOYS TO WORK IN WHEN JUMBOS ARE IN FACE
45-LB. SWITCH CROSSOVER WHICH IS MOVED FORWARD AT 120-FOOT INTERVALS
END OF 60-LB. RAILS
FULLS
"A"
16'
5'-6"
"B"
EMPTIES
SYMMETRICAL CALIFORNIA SWITCH, 50' LONG, SLIDES ON TOP OF EXISTING TRACK & MOVES FORWARD AS FACE ADVANCES
JUMP SET FITS OVER SWITCH & JOINS 45-LB. RAILS
30'-45-LB. TRACK FOR JUMBO LAYBY

FIG. 2—TRACK LAYOUT used in end of 45 Haulageway during period when two Model 21 loaders were in service.

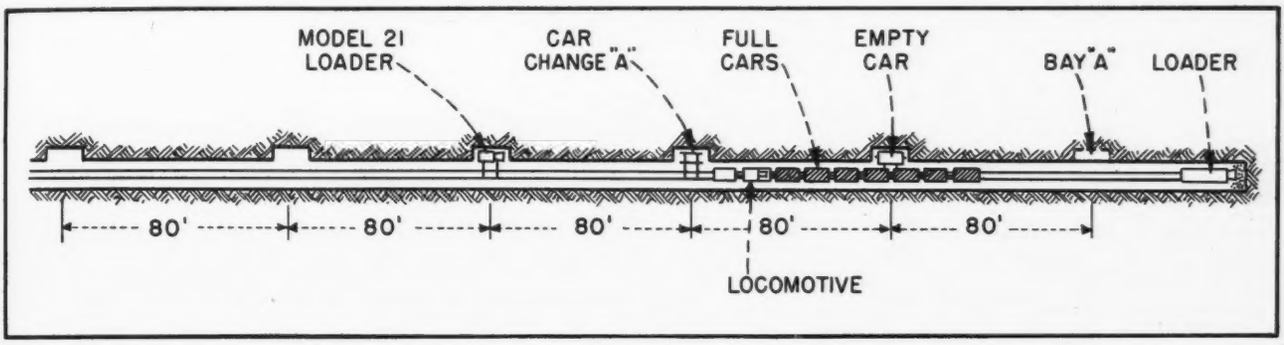


FIG. 3—CAR-TRANSFER BAYS near the face which were used in driving 45 Haulageway are shown.

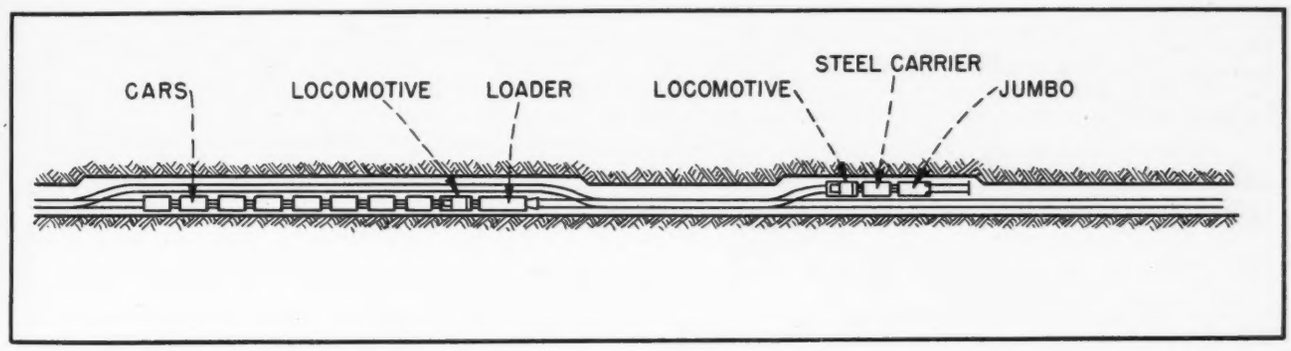


FIG. 4—LOOP FOR TRAIN PASSING in 45 Haulageway was kept not more than 1,000 ft. from face. The lay-by for jumbo and loader is seen.

in American high-speed bores of similar size revealed that most tunneling engineers favored a single track with a car-changing device at the face of the heading and, second, that the air pressure used at the face was around 125 psi. It was decided to change the track layout in the face, build a new jumbo for use with a single track, and to step up the air pressure.

To increase the air pressure at the face a booster compressor was installed at 5 Level Reef Drive, this being a central point. It was a Broomwade compressor, Type EH 240, a two-cylinder, 10-in. bore x 12-in. stroke machine. When taking in air at an initial pressure of about 75 psi., it delivered approximately 1,600 cfm. at 100-psi. pressure. The valves were so arranged that, should the compressor break down, it can be isolated and air at normal pressure delivered to the face.

Air was conveyed to the booster in the permanent 16-in. pipe and was delivered from it to the face in a 6-in. pipe. Air pressure at the face was around 95 psi.

Air Is Filtered

On account of the distance from the shaft, it was impracticable to exhaust air to it, as had previously been done. A filter plant was constructed at the intersection, through which exhaust air from the end was passed. Air from this filter entered the mine workings.

The plant consisted of a two-deck sawdust filter, each deck 20 ft. x 5 ft., with 1½ in. of sawdust per deck, followed by six standard flannel bags attached to a header. Air from the chamber was blown through the bags by a 12½-hp. high-pressure fan. The air then passed through a water spray and out into the mine. It was diluted by 25,000 cfm. of fresh air.

The sawdust was raked over after every blast. The filter bags were

Table I. Total Crew Used in Driving 45 Haulage

	Europeans		Natives	
Supervision	1	Mine overseer	1	
	4	Shift bosses	4	
Mining	3	Developers	42	(12 machines, 1 spitter, 1 learner per shift)
Mucking	4	Loadermen	24	(1 boss boy, 1 hose, 2 shovelers, 2 loco., 2 guards per shift)
	*3	Loco. drivers	3	(1 guard per shift)
Maintenance	1	Pipes and tracks	10	(6 on day shift, 2 on afternoon shift and 2 on night shift)
	1	Plate layer	7	
Battery charging			3	(1 per shift, who is also first-aid boy)
Booster compressor			3	(1 per shift)
Ventilation			3	(1 per shift)
Engineering	1	Fitter	3	
	1	Electrician	3	
	1/3	Rigger	2	
	1/3	Carpenter	2	
	1/3	Mason	2	
	1	Welder	1	
	21		113	

*23-ton overhead trolley locomotive in use on first 6,000 ft. of the haulage.

Table II. Performance in 45 Haulage

Month	June, 1947	August, 1947	February, 1948
Type of ground	Shale	Shale	Shale
No. of working days	26	26	26
Footage advanced	804	889	1,132
Rounds blasted	112	120	138
Average footage per round	7.18	7.40	8.20
Average cycle (blast to blast)	5 hr. 34 min.	5 hr. 10 min.	4 hr. 30.6 min.
Average re-entry period	31 min.	32 min.	32.5 min.
Average watering-down and barring time	10 min.	10 min.	10 min.
Average mucking time	2 hr. 22 min.	2 hr. 13 min.	1 hr. 39.7 min.
Average time removing loader and bringing in jumbo	30 min.	30 min.	25.3 min.
Average drilling time	1 hr. 29 min.	1 hr. 17 min.	1 hr. 15.4 min.
Average charging and blasting time	32 min.	28 min.	27.7 min.
Blasts per day	4.3	4.6	5.3
Footage per day	30.9	34.2	43.5

Note: August, 1947—Best achievement using Model 21 loader.
February, 1948—Best achievement using Model 40 loader.

Table III. Comparison of Costs

	Basis of 804 ft. per month			Basis of 1,132 ft. per month		
		Cost/ ft.	% of total costs		Cost/ ft.	% of total costs
Labor		£2.11.10	28		£2.11.7	29
European labor (incl. all allowances)	£1.11.0			£1.11.1		
Native labor	1. 0.10			1. 0.6		
Compressed air and power		12.8	7		12.8	7
Hoisting		6.4	3		6.4	3
Supplies		5.13.8	62		5. 9.6½	61
Current Stores						
Rock-drill maintenance	3.9			1.8		
Drill steel and sharpening	1.6			1.2		
Explosives	11.3			13.10	5% (increase in cost)	
Electric detonators	4.11			4.6½		
Pipes and fittings	12.7			11.2		
Cables and boxes	1.5			2.9	95% (increase in cost of cables)	
Lubricants	1			1		
Sundries	2.3			1.10		
Loader repairs	4.6			2.7		
Permanent Equipment						
Rails and accessories	1. 4.5			1. 5.10	5% (increase in cost)	
12" air column	16.7			16.7		
Electric equipment	1.10.5			1.13.6	10% (increase in cost)	
Total		£9. 4.6	100%		£9. 0.1½	100%

seasoned with lime dust to 1 in. water-gage before installation. This reduced the dust count at the peak period from 2,300 to 270 p.p.c.c. The bags were serviced when the water gage reached 3½ in.

Ventilation of the end was effected by means of 22½-in. diameter ventilation pipe. When this column was 5,000 ft. long, three fans in series were used. They exhausted 4,000 cfm. from the face. Another booster fan delivering 3,000 cfm. or more ventilated the end.

Ammonia solution was sprayed into the face at blasting time by means of the booster fan. The effect of this on nitrous fumes is still somewhat contentious, but tests revealed that the percentage of NO_2 was reduced by 60% before dilution with the fresh air. Ammonia had no apparent effect on either CO or CO_2 and dilution was relied upon to render the air safe. Another ammonia spray-gun was located 1,300 ft. from the filter plant. This was turned on when the round was blasted.

Twin water blasts of approved design were also maintained in the end.

Track Layout in Face

The original double-track layout was replaced by a single track and three car transfers. Extension tracks of 45-lb. rail were installed ahead of the permanent 60-lb. track as the loader cleaned a round. The bays for the car-changing device (see Fig. 3) were cut out as the face advanced. Three transfers were maintained, the middle one, designated as car-change "A," being brought into use should the front one be damaged.

The loop, or siding, for train passing was kept not more than 1,000 ft. from the face. This is of importance because the time from the departure of a loaded train from the face until empty cars are returned must be kept to a minimum. The haulageway was cut approximately 2 ft. wider on the left-hand side over the length of the loop. The loop was made 120 ft. long, sufficient to hold eight 4-ton Granby-type cars plus a 4-ton battery locomotive. The haulageway was cut wider in a similar manner for a 60-ft. stretch at another point to provide a lay-by for the loader and jumbo.

Fig. 4 shows conditions at the loop when drilling has just been completed and one locomotive has removed the jumbo and steel carrier from the face and parked them

in the loader-jumbo lay-by. The other locomotive is waiting on the main track of the loop with the loader in front and a train of eight 4-ton cars behind. In actual practice a second train of eight cars would be in the loop.

The loader, locomotive and cars now moved forward to the blasting point and waited there until the 30-min. re-entry interval had expired. As soon as watering-down and barring operations were started, the whole train moved towards the face. The locomotive uncoupled from the cars just short of the front car-changing device, or transfer, and then pushed the loader up to the point where the 100-ft., 1½-in. air hose could be connected.

Loading was carried on continuously until the loader cleaned past the end of the tapered ramp rail on the forward end of the track. It then pushed the ramp rail forward approximately 2½ ft. and a 2-ft. extension track was fitted. The ramp rail was then levered back to join up with this extension piece. Loading again proceeded. Ramp rail and extension rails were secured together by means of ½-fish-plates bolted on the outside of the rail at one end only. Extension rails were of 2-ft., 4-ft., 8-ft. and 12-ft. lengths, the shorter rails being replaced by larger ones as the face advanced.

During the later stages of development, the track was advanced by means of the extension rails for one week, thus saving approximately 20 minutes per day which previously was spent in replacing extension rails by 30-ft. lengths of 45-lb. rail. Installation of permanent track was done on Sundays, 240 ft. of track being installed in 2½ hr.

Changing a Car

The car transfers were used in the usual way. As soon as the first car was loaded, the locomotive pulled it back past the transfer, the empty car on the transfer was put on the main track, and the locomotive then pushed both the loaded car and the empty car to the loader. In this way each car was changed from one end of the locomotive to the other. Part of the drilling crew trammed the cars and operated the transfer.

When the last car but one of the train was loaded, the motor pulled the loaded cars to the main haulage by-pass. When this train had passed the loop, the other locomotive and cars waiting in the loop would move forward to the face. While this locomotive was in at the loader, a third train of eight empty cars would be brought to the loop. Tramming from the main haulage by-pass was done by a diesel locomotive until the trolley locomotive was put into commission.

Cleaning and track extension operations continued until the round was cleaned.

A small amount of dirt in the corners of the face could not be scooped up by the loader. This was cleared by the machine boys. The loader was then removed.

The Redesigned Jumbo

During the loading cycle, the jumbo was in its lay-by being cleaned and serviced for the next drilling period. As soon as the loader had been towed past the lay-by, the second locomotive pulled the steel carrier and jumbo on to the main line and then pushed them into the face.

The Grootvlei jumbo weighs 2½ tons without equipment. Six 3½-in. Leyner machines were used for drilling the round. The ring-feed air and water pipes on the upper deck supply air and water to the drill, six 1-in. taps being fitted on each pipe at the front of the jumbo.

At the face, the jumbo was pushed into position by the locomotive, and wooden wedges were placed at the back of each wheel, this being the only thing necessary to hold the jumbo in place during drilling. The "developer" was now given his grade and direction lines by either the shift boss or the loaderman. He then marked off the direction of the side holes and the positions of the first holes to be drilled. With the assistance of the loaderman, he directed the machines and started drilling the 42-hole drag round used.

The following drilling speeds were made in shale, with and without the booster compressor. Without the booster the speed was 12.1 in. per min. Air pressure, running, was 72 psi. With the booster the actual speed was 18.9 per minute and the air pressure, running, was 95.6 psi.

Blasting was done electrically. Delays used were from 1 to 11 inclusive. On the way to the blasting point the developer opened the twin water blasts. If the correct resistance, of between 80 and 85 ohms, was obtained, the developer, who had the exploder key in his possession, went to the booster fan and opened the 1-in. air tap which supplied air to the ammonia spray gun. He then went back to the blasting point and fired the round. A 150-shot spring-type exploder was used.

The complete crew allocated to 45 Haulage during February, 1948, is given in Table I.

Table II shows results achieved in June and August, 1947, when using the Model 21 loader, and in February, 1948, when using the Model 40 loader. It will be noticed that the mucking time per cycle for February was considerably less than in the other two months. This was due entirely to the greater loading rate of the Eimco 40 loader. When operated by air with a pressure of 95-100 psi., the Model 21 loader was found to have a loading rate of 1 ton per minute, while the Model 40 loader was capable of loading at the rate of 3 to 4 tons per minute. One of the advantages of the Model 40 loader is that approximately 1½ tons of muck can be loaded on to the conveyor belt during the car-changing period in readiness for the next car.

It is also interesting to note the gradual improvement in length of round pulled as the developers became more experienced.

Driving Cost Reduced

A comparison between the cost per foot in June, 1947, when 804 ft. was driven, and the cost per foot in February, 1948, when 1,132 ft. was driven, is given in Table III.

The cost per foot for labor in February, 1948, was influenced by the following:

(1) The European crew was paid an additional 1s. per foot for all footage driven over 600 ft. when the monthly footage exceeded 1,000 ft. This additional bonus amounted to £575/19/10 for 1,132 ft., or 10/2 per foot.

(2) The Native crew was each paid £1 additional bonus when the monthly footage exceeded 1,000 ft. The bonus amounted to £82, or 1/5 per foot.

During February the replacement of worn or broken parts in the rock drills was the lowest on record. Also, due to a change-over to jackhammer development in certain parts of the mine, it was not necessary to issue new Leyner steel.

The information given here has been drawn from unpublished papers prepared for the Transvaal Association of Mine Managers by the late Mr. Van Eyssen, previously mentioned, and by W. T. Stobart, sectional underground manager for the Grootvlei company.

HOW ALLOYS IMPROVE WHITE CAST IRON

UNALLOYED IRON—Hardness, 387 Brinell

ALLOYED IRON—Hardness, 650 Brinell

BOTH SAMPLES ABOVE were taken from chill cast liners (Mag. 500X). In both samples the hard and brittle carbides (white) are supported by a matrix. The unalloyed cast iron at left is softer than the alloyed cast iron because: (1) The pearlite matrix (laminated) is softer than the martensite matrix (needles) and (2) the carbides in alloyed cast iron are harder than in the unalloyed cast iron. The harder structure is obtained by alloying the cast iron with moderate amounts of nickel and chromium.

Alloying White Cast Iron

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WHEN WHITE CAST IRON is suitably alloyed to change the matrix structure from the usual pearlite to hard martensite, the resulting iron has a hardness range of 550 to 725 Brinell, and a 25 to 50% greater strength and impact resistance. The increase in service life is usually of the order of 2 to 3 times. This article explains why alloy white cast iron is harder and tougher, and presents application and performance data of specific interest to mine operators and mill men.

White cast iron, because of its carbidic structure, possesses unusual abrasion resistance. It is widely used for those services where abrasion is a major concern and impact a minor consideration. Availability and service performance are inherent factors in the widespread use of this material. This article describes significant improvements in the properties and service performance of white iron brought about by the use of alloys. The engineering properties of white iron with suitable alloy content are 25-50% greater than those of the unalloyed product while the service performance is usually 100-200% greater.

Abrasive Wear

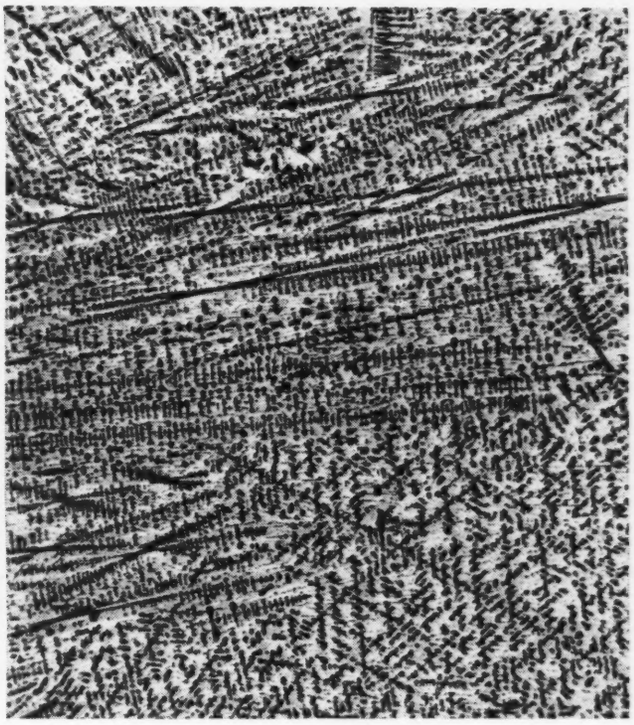
Two prime factors determining the abrasion resistance of metals are: (1) the hardness of constituents in the structure and (2) the tenacity with which adjacent particles are held together. The optimum combination of these two factors is important in most industrial service. Generally speaking a high level of metal hardness infers good abrasion resistance. Outside of the field of metals there are cases, however, where toughness or resilience compensates for lack of hardness, for example, the ability of rubber to resist wear under certain conditions. Low carbon steel is considered a tough material but it cannot be considered an abrasion resistant material, probably because its toughness is not adequate to compensate for its low hardness.

"Heat" under dry abrasive conditions and "corrosion" under wet conditions also take a toll on wearing parts. However, these factors are usually masked by the action of the abrasive but are none the less important.

Abrasive wear results from a scratching or scouring action usually supplemented by impact loads which vary over a wide range depending upon the type of service. In the absence of impact, maximum hardness of the abrasion resisting surface usually gives minimum metal wear. As impact loads increase the need for toughness increases to avoid premature failure by breakage and to achieve maximum abrasion resistance. If the toughness is not increased as the impact loads mount, metal wear increases because of local chipping, spalling and cracking at the point

HOW CHILL CASTING IMPROVES WHITE CAST IRON

SAND CAST SAMPLE



CHILL CAST SAMPLE

STRENGTH, IMPACT RESISTANCE AND HARDNESS of both pearlitic and martensitic white iron are improved 10 to 50% by chill casting as compared with sand casting. This improvement is due to the refinement of carbide size resulting from the rapid freezing of the metal in contact with the chiller. In the above photographs of martensitic samples (both Mag. 25X) note how much finer the grain size is in the chill cast sample. Carbides are white; matrix is black.

Increases Abrasion Resistance

of impact. The impact resistance of iron and steel increases as the hardness decreases, hence these two properties must be balanced to arrive at optimum abrasion resistance.

Many attempts have been made to correlate the hardness of iron and steel with abrasion resistance. The general conclusion seems to be that these two properties are not directly related and that their relation varies with the nature of the abrasive. Possibly the difficulty of holding the many factors entering into abrasive wear constant has influenced this apparent lack of correlation. More attention could profitably be lirected to a study of microstructure along with hardness in evaluating abrasion resistance of iron and steel.

Generally speaking the abrasion resistance and hardness of white iron increase with its carbide content or in other words with its carbon content. It is axiomatic that all of the carbon must be in combined rather than graphitic form. Graphite, being soft and weak, is rapidly abraded away, and the voids it leaves in the metal accelerate abrasive wear. As little as .25-.50% carbon in graphitic form will markedly decrease the abrasion resistance of any type of white iron.

Why Alloys Improve Iron

Increase in abrasion resistance with carbon content is true only if the carbides which are hard and brittle are supported by a strong, resilient matrix. For this reason alloys play an important part. They change the matrix structure of unalloyed white iron from pearlite with a hardness of 300-350 Brinell to martensite with a hardness of 550-600 Brinell. The latter structure is considerably stronger than pearlite and more adequately supports the carbides, preventing cracking and spalling. At the same time, martensite is more abrasion-resistant itself because of its greater hardness.

The carbides of the alloyed iron are harder than those of unalloyed iron, respective Vickers hardnesses being about 1,500 for the former and 1,200 for the latter. (The Vickers hardness of martensite is 600-650 and of pearlite 300-350.) The composite of alloyed carbides in an alloyed matrix possesses unusual abrasion resistance with strength and toughness characteristics considerably in excess of the corresponding unalloyed form of white cast iron.

Typical microstructures of unalloyed and alloyed white irons are shown in accompanying photographs. The former represents the unalloyed product and will be seen to consist of iron carbides imbedded in a matrix structure of pearlite. The latter represents the alloyed material and shows carbides in a matrix of martensite. The martensitic iron usually contains soft, retained austenite in small amounts which improves transverse bending and impact properties of the cast iron.

The most commonly used martensitic white iron contains nominally 4½% nickel and 2% chromium and is marketed under the trade name

TABLE I—Comparison of Pearlitic and Martensitic White Irons

Chemical Analysis	Martensitic White Iron	Pearlitic White Iron
Total Carbon	2.50-3.50	2.50-3.50
Graphitic Carbon	0.05 max.	0.05 max.
Silicon	0.40-0.60	0.40-0.60
Manganese	0.40-0.60	0.40-0.60
Nickel	4.25-4.75	.....
Chromium	1.40-3.00	.....

Properties	Sand Cast[1]	Chill Cast[1]	Sand Cast	Chill Cast
Brinell Hardness[2]	525-650	575-725	400-475	425-500
Rockwell C Hardness	52-61	56-64	43-49	46-51
Trans. Strength, 12" span (lbs.)[3]	4000-5500	4500-7000	3000-5000	4000-6000
Trans. Deflection, 12" span (in.)[3]	.080-.120	.080-.120	.055-.110	.070-.110
Tensile Strength, psi[3]	40-55, 000	50-75, 000	35-45, 000	40-60, 000
Impact Strength, ft. lbs.[4]	20-35	25-55	15-25	20-40

[1]Properties after drawing 5 hrs. at 400°F. [2]Determined on 2x6x6" test blocks, using tungsten carbide Brinell ball. [3]1.20" diameter test bars. [4]1.20" diameter unnotched bar, struck 3" above support.

TABLE II

Cross-Sectional Hardness of Martensitic White Iron Liner

	Brinell
Chilled face	725
½" depth	689
1 " depth	664
1½" depth	605
2 " depth	627
2½" depth	600
3 " depth	591
3½" depth	578

Chemical Analysis	
Total carbon	3.08
Silicon	0.57
Manganese	0.40
Nickel	4.36
Chromium	1.93

TABLE IV

Work Hardening of Martensitic White Iron Grinding Balls

	Ball No. 1	Ball No. 2
*Brinell hardness of extreme surface	780	785
*Brinell hardness 1/64" under surface	745	769
*Brinell hardness 3/16" under surface	685	704

*These hardness numbers converted from Vickers hardness determinations.

TABLE III—Comparative Abrasion Resistance of Sand Cast and Chill Cast Martensitic White Iron

A. Swing Hammer Test
Metal Composition: Total Carbon 3.40, Silicon .50, Manganese .50, Nickel 4.50, Chromium 1.50.
Abrasive: Dry silica sand, ferro-manganese, ferro-silicon.

	Sand Cast 600 BHN	Chill Cast 683 BHN
Weight loss after 30 hours; abrasive-dry silica sand	1.28%	0.61%
Weight loss after 17 hours; abrasive-dry sand, ferro-manganese and ferro-silicon	0.45%	0.23%

B. Impeller Blades Handling Chilled Iron Grit
Metal Composition: Total Carbon 2.90, Silicon 1.40, Manganese 0.40, Nickel 4.50, Chromium 1.50.

	Sand Cast 585 BHN	Chill Cast 615 BHN
Weight loss after 68 hours' service	26.1%	13.7%

TABLE V—Comparative Life of Ball and Rod Mill Liner Materials in Ore Milling

Mill Size	Ball or Rod Size (In.)	Type of Discharge	Type of Ore	Unit of Comparison	Martensitic White Iron	Service Life Austenitic Manganese Steel	Pearlitic White Iron
Ball Mills							
9 x 9'	4	Grate	Copper	Hours	6,200	4,500	
7 x 10'	2¼	.....	Copper	Months	33-39		12-15
7 x 10'	4 & 5	Overflow	Gold	Tons of Ore	313,980	150,569	
				Liner Cost, c/ton	0.78	1.77	
7 x 6'		Overflow	Gold	Days	495	294	
				Tons of Ore	195,765	116,449	
6 x 6'	2½	Overflow	Gold	Months	18		7
9' x 48"	3½	Trunion	Gold	Hours	5,563	3,633	
				Tons of Ore	117,280	75,865	
				Liner Consumed, lbs./ton	0.24	0.36	
				Liner cost, c/ton	2.1	3.9	
Rod Mills							
6½ x 15'	2½	Open end	Nickel-Copper	Tons of Ore	503,617	261,297	
				Liner Consumed, lbs./ton	0.1022	0.1670	
				Liner cost, c/ton	0.834	1.796	
5 x 10'	2½	.....	Zinc	Months	52	32	

TABLE VI—Comparative Performance of Various Mining Castings

Casting	Type Ore	Unit of Comparison	Service Life: Martensitic White Iron	Unalloyed White Iron	Steel	Remarks
Classifier Shoes	Copper	Months	24		*6½	Rake type
Classifier Shoes	Copper	.....	3	1		Spiral Type
Flotation Machine Parts	Copper	Months	24	6-7		
Grinding Balls	Pyrite	.....	1.7	1		1½" dia.
Grinding Balls	Copper	.....	2.5	1		3" dia.
Pump Impeller	Copper-Nickel	Hours	1,319	551		3" tailings pump
Pump Impeller	Zinc	Days	90	28		2" tailings pump
Pump Impeller	Copper	Hours	1,850	500		20" dredging pump
Pump Casing	Copper	Hours	3,500	700		20" dredging pump
Roll Shells	Lead-Zinc	Days	76	20		42x20" rolls
Scoop Lips	Gold	Months	4-5	1		
Scoop Lips	Gold	Days	90		**30	
Stamp Shoes	Copper	Days	11	5		850 lb. shoes, steam stamp

*Mild Steel. **Manganese Steel.

Ni-Hard.* The chemical analysis and properties of this material are compared with unalloyed white iron in Table I. It will be seen that the martensitic iron is 125-225 Brinell points harder and exhibits substantially greater transverse, tensile and impact strengths.

Since martensitic white iron after initially cooling to room temperature is in some ways akin to a quenched steel, it is not unusual that it is benefited by a stress relieving treatment, which consists of drawing at 400 deg. F. for 4-10 hours. This treatment increases the transverse and tensile strength as much as 50% over the "as cast" condition without altering hardness.

Irons of this type possess unusual depth hardening qualities. This is demonstrated in Table II showing a hardness traverse on the cross section at a central location of a 4-in. thick mill liner segment, chilled on one face. High hardness at depth such as this is responsible for the excellent abrasion resistance of the martensitic irons in heavy sectioned castings.

Chill Casting Versus Sand Casting

As shown in Table I the strength, impact resistance, and hardness of both pearlitic and martensitic white iron are improved 20-50% by chill casting as compared to sand casting. This improvement is due to the refinement in carbide size resulting from the rapid freezing rate of the metal in contact with the chiller. Another advantage of the chilled casting lies in its longer service life which is attributed to the greater cracking and spalling resistance of the fine carbides and the fact that with improved strength, a given part will wear thinner before failing.

The accompanying photographs illustrate the refinement in carbide size of martensitic white iron resulting from casting against a chill. Table III illustrates the improvement in abrasion resistance with chilling in two tests involving dry abrasion. Reports from the field indicate a 25 to 100% improvement in the life of abrasion resisting parts due to chill casting under both dry and wet operating conditions.

Reference was made earlier to the fact that martensitic white irons normally contain small amounts of soft austenite which improve bending and impact properties. Tests have shown that under impact this retained austenite transforms to hard martensite at the wearing surface. In the instance of shell liners in the 6½x15-ft. mills using 2½-in. rods at the concentrator of the International Nickel Co., the work hardening which occurred at the liner surface amounted to 85 points Brinell as illustrated in the table which follows:

Work Hardening of Martensitic White Iron Rod Mill Liners

*Brinell hardness of extreme surface	670
*Brinell hardness at 1/16" under surface	585
*Brinell increase due to work hardening	85

*These hardness numbers converted from Vickers hardness determinations.

The work hardening that occurred at the surface of 1¼-in. diameter martensitic white iron balls in the dry grinding of anthracite coal in an 8x17′ mill was in the range of 81-95 points Brinell, as shown in Table IV. In this case the high initial hardness of the metal (685 to 704 Brinell at a depth of 3/16-in. under the skin) suggests that work hardening may occur even in the absence of any substantial amounts of retained austenite, or in other words, that martensite also work-hardens.

Service Performance

Service tests under a wide variety of operating conditions have demonstrated the merit of martensitic white iron over the unalloyed or pearlitic type. In those services where impact loads are not excessive, martensitic iron has shown greater life and economy than various types of abrasion-resisting steels.

The most widespread use of this alloy iron is in the mining industry for such castings as grinding balls, ball and rod mill liners, scoop lips and feeders, classifier shoes, pump and flotation machine parts, stamp shoes and mortars, chute liners and roll-shell cheek plates.

Of current interest in this field is the adoption of two-inch chill-cast martensitic white iron grinding balls for both primary and secondary grinding at a large copper company. The martensitic balls replaced unalloyed pearlitic white iron after a six-month production test had established that the alloyed balls outwore the unalloyed product by 69% while costing only 30% more. The resulting economy has made the use of martensitic iron balls very attractive and well over 10,000 tons of these balls have already been put into service. Laboratory results at this company show martensitic white iron balls to outlast hardened, forged steel balls by 10-20% and hence to be considerably more economical.

Other comparative tests on abrasion-resisting parts in the mining industry are summarized in Tables V and VI.

Large tonnages of martensitic white iron rolls have long been used for the hot and cold rolling of steel, and non-ferrous metals. By reducing abrasive wear this type of iron has introduced greater efficiency and economy of operation in a variety of industrial applications including the grinding of raw stone and fired clinker in the cement industry, the grinding and working of clay and refractory materials, the pulverizing of coal and conveying of wet and dry ashes, the grinding of paint pigments and the propelling of metallic shot and grit in cleaning operations.

Summary

1. The addition of a nominal 4½% nickel and 2% chromium to white cast iron changes its matrix structure from the usual pearlite to hard martensite and also hardens and refines the carbides, producing a composite structure with outstanding abrasion resistance.

2. Martensitic white iron has a hardness range of 550 to 725 Brinell and possesses 25 to 50% greater strength and impact resistance than the pearlitic type. It maintains a high level of hardness throughout sections 4 to 6-in. thick.

3. Both the engineering properties and abrasion resistance of white iron are substantially improved by chill casting.

4. Retained austenite usually present in martensitic iron work hardens at the wearing surface under the impact loads of service.

5. The service performance of martensitic white iron is usually 2 to 3 times that of pearlitic iron. In those services where impact is not a factor it has shown 25 to 200% greater life than various abrasion resisting steels.

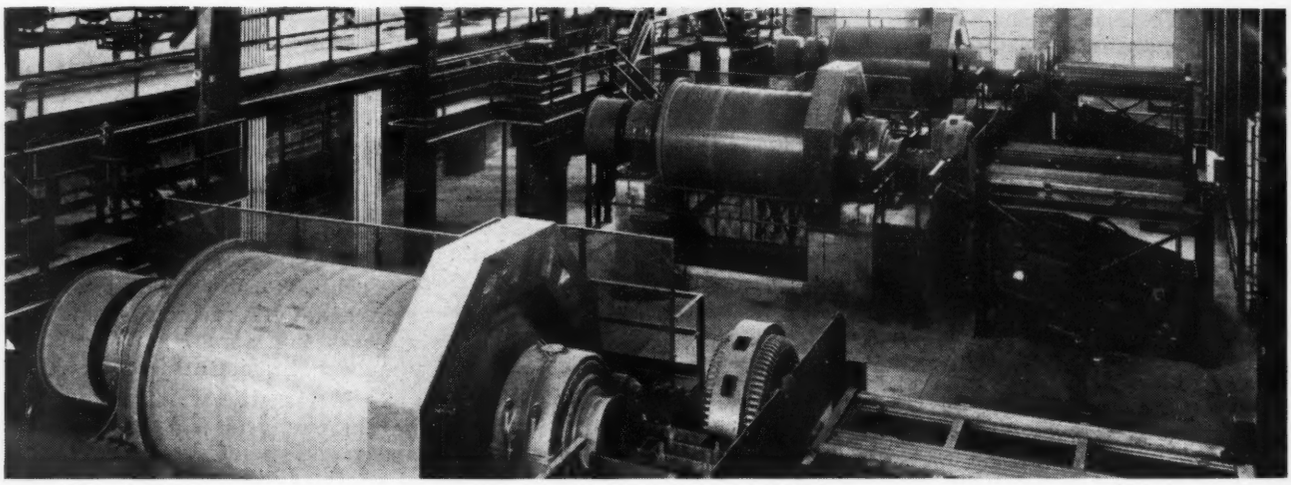
6. The excellent abrasion resistance of martensitic white iron minimizes metal wear loss in the grinding, working and conveying of ore, cement, clay, coal, ash, sand and a host of other abrasive materials.

*Reg. U. S. Patent Office, The International Nickel Company, Inc.

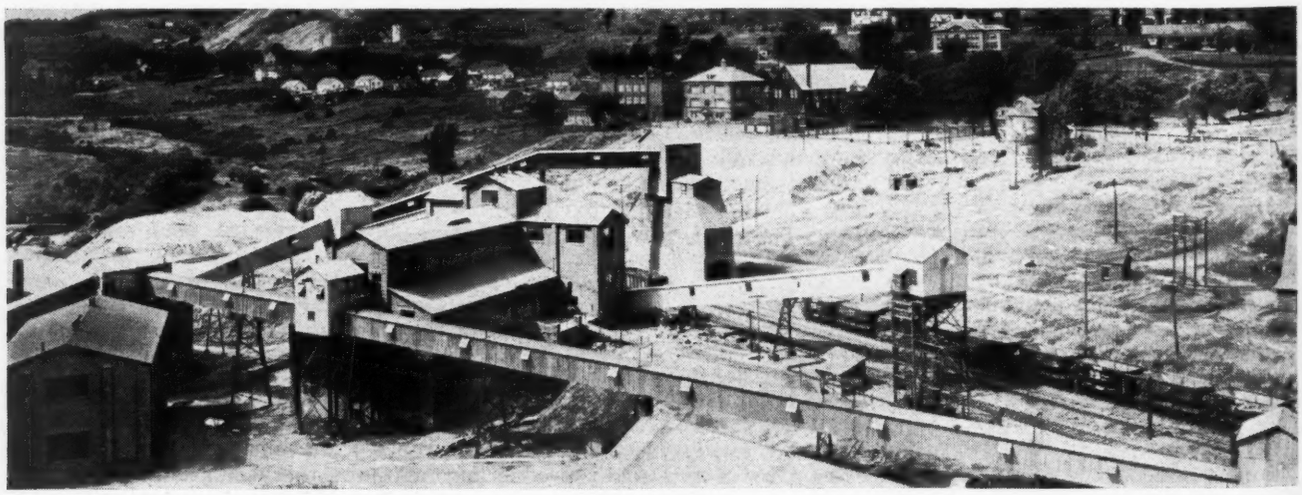
Camera shots from two important districts

MINEVILLE DISTRICT ore is concentrated and sintered at this ultra-modern plant of steel and concrete. Capacity of concentrator is 300 tons of finished product per hour; that of sintering plant, which is seen at the right of the concentrator, is 3,000 long tons per day.

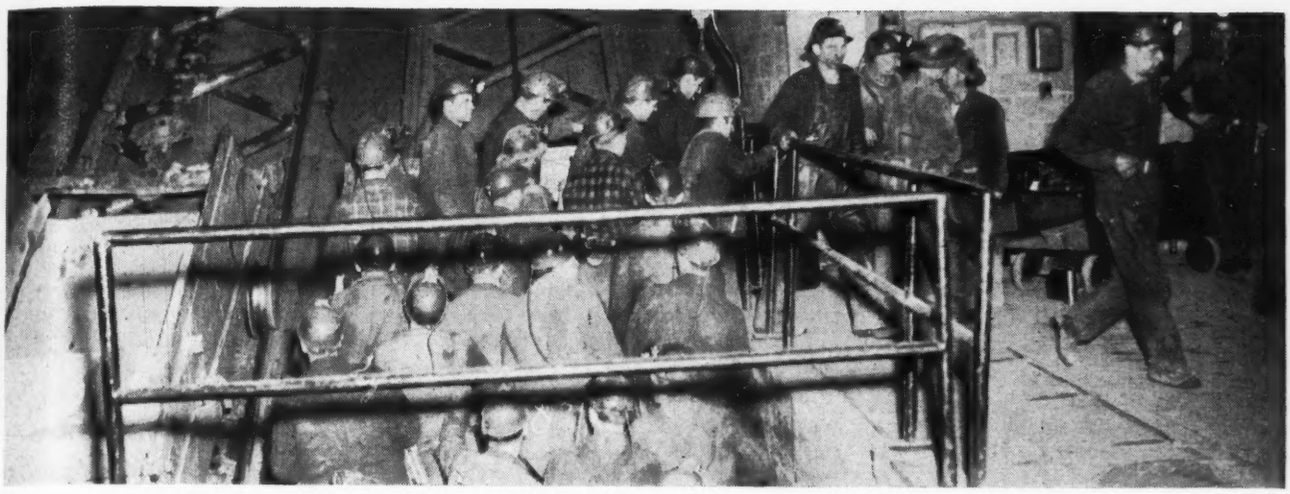
Republic Steel Mines



ROD MILL BATTERY in concentrator near Mineville. All operations on each of the three units are controlled automatically from a central point. As indicated here, the plant is kept in spic-and-span condition. Note how the new rods for each mill are stored conveniently at one end.

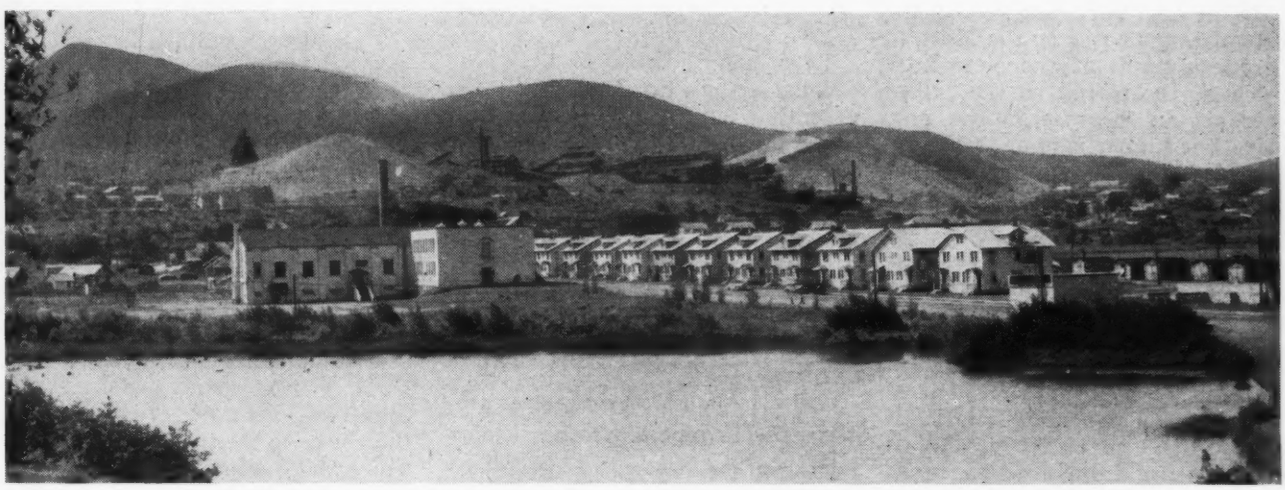


MINEVILLE ORE is crushed and cobbed in a plant near shaft and hoist house, here seen in foreground, and then dispatched to concentrator approximately three miles away. Club building, office, hospital and homes of employees are situated in the background.

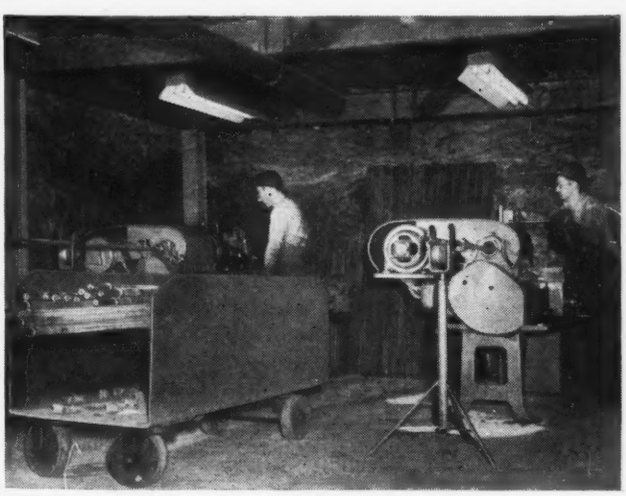


MINERS coming off shift at Mineville. A man car, specially designed for the comfort and safety of employees, is provided for taking the men underground and out again. The men are equipped for safety. At left is seen the skip in one of the two ore-hoisting compartments.

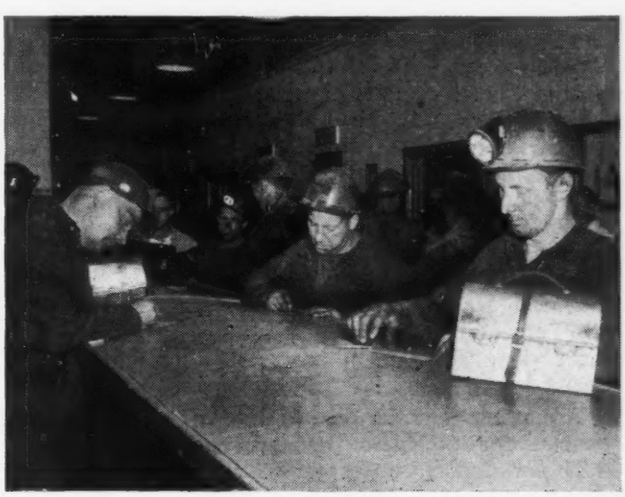
New York Iron Ore



AT LYON MOUNTAIN, the home of Republic's famous Chateaugay "low-phos" ore. In the distance, behind the village with its school house, is to be seen the surface plant of the mine, with the up-to-date concentrator and continuous sintering plant that serve it.



RECONDITIONING DRILL rods in Chateaugay mine. Elsewhere along line in shop, detachable bits are hot-milled and heat-treated.



TIME REPORTS are made out by Republic's miners coming off shift. In another part of the building is the well-equipped change house.

Mexico's Tax Jumble

Odd Structure for Mining Throttles Benefit of Higher Metal Prices

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INDIVIDUALS IN MEXICO engaged in mining, that country's most important export industry, view with mixed reactions the advent of higher base-metal prices in the United States and the supposedly stimulating effect of the recent depreciation of the peso on the country's exports. The reason mine operators are not throwing their hats into the air with joy lies in the rather unique tax system with which producers have to contend in Mexico.

In the case of certain metals, the rate of tax is based on the Mexican peso equivalent of the New York price of the metal, so that when there is an increase in the peso price, the higher rate of tax is applicable not only to the increase but to the full price. It is clearly a tax of "diminishing incentive."[1]

Dollar Value Counts

In the Mexican mining world the value of output is thought of not in terms of Mexican pesos but of American dollar value. True, Mexico has its own currency, and its tax laws are formulated in terms of pesos, but the peso price is based upon world price. So, when the New York price of lead, for instance, goes up, the peso price in Mexico rises *pari passu*. Similarly when the foreign-exchange value of the peso in terms of the dollar declines, the New York price of lead, translated into pesos, goes up correspondingly, thus bringing into play the higher tax rates prescribed in the law. Incidentally, Mexico's production tax is based upon the New York quotation.

Discussing the effects of the recent price rise in base metals in New York and the peso's decline, a writer in "Excelsior" early in August brought out the following:

> Assuming that the rate of exchange for the peso, formerly 4.85 per dollar, settles at 6.50, the mining industry will have to pay in taxes 150,000,000 pesos more than formerly. The position of the industry is therefore not benefited by the depreciation of the peso and in the case of some metals all profits will be absorbed in taxes.
>
> Whatever profit is left to the industry after the higher taxes is likely to be wiped out by the higher cost of imported machinery and supplies—measured in pesos; as well as the rising costs of Mexican supplies.
>
> When lead in New York was quoted at 17½c. U. S. currency and when the peso stood at 4.85 per dollar, the Mexican production tax for lead producers was 17%. Now, with N. Y. lead at 19.5c. and the peso at 6.50 per dollar, the tax increases to 26.3%.
>
> Similarly, the tax has increased in the case of copper from 8 to 12%; zinc, 6 to 9%, not counting the various other taxes, most notably the export tax of 5.1%.

[1]The progressive tax does not apply to all metals, but only to the principal ones (copper, lead, zinc, silver and mercury).

Mexico Levies New Tax

Late in August, Mexican silver producers were reported to be holding up sale of the metal pending clarification of a new 15% export tax just decreed by the Mexican government.

The new tax is levied in addition to those export, and other, duties mentioned by Mr. Bratter. It applies to copper, lead and zinc as well as silver. It is said to be designed to halt excessive flow of goods from Mexico resulting from the recent drop in the value of the peso.

At 73½c. per oz. for silver, the 15% tax would come to about 11c. per oz. for refined metal. For copper, the tax would come to 3½c. per lb.; for lead, 3c. per lb., and zinc 2¼c. per lb. The Mexican treasury has the right to exempt metals from this tax on the ground that they have already paid sufficient tax.

So the Mexican producer of lead now gets 0.006c. per kilo less than before the "stimuli" of higher N. Y. prices and a cheaper peso. The silver producer gets 50c. U. S. less per kilo. The producer of copper gets $14.47 less per ton; and of zinc, $9.80 less per ton.

This situation is aggravated to the extent that devaluation of the peso provokes new increases in the peso value of metals. Thus at 7 pesos per dollar, the tax in terms of Mexican currency on gold increases 44%; on silver, 58%; on copper, 90%; and on zinc, 84%.

The Case of Silver

How Mexico "thinks in terms of dollars" is illustrated in the case of silver, which the Bank of Mexico supplies to the jewelry industry. Before the unpegging of the peso late in July, the Bank sold silver to such users in terms of pesos. The peso price was the equivalent of the N. Y. official price for "foreign silver." At this writing, the peso being still unstabilized, the jewelers must pay for their silver in dollars, the result being a stimulus to the black market, where some peso coins are believed to be finding their way to the melting pot, being worth more as bullion.

A mining company furnished me with a tabulation, summarized thus:

> Assuming the same price of silver throughout, with the peso at 4.85 per dollar, Mexico's annual silver production has a value before taxes of $37,300,000 and, after taxes, of $27,800,000.
>
> With the peso at 6.50 per dollar, the value before taxes is also $37,300,000 but the value after taxes is only $27,000,000.
>
> Whereas the silver mining industry at the old rate of exchange and the taxes then applying, had a product worth 181,300,000 pesos and at the new rate of exchange, worth 242,500,000 pesos (an increase of 61,200,000 pesos), the taxes collected from the silver producers go up by 20,400,000 pesos ($730,900), so that the silver mining

industry after taxes have been paid to the government is only 40,800,000 pesos better off.

The foregoing assumes a stable price of silver. Should silver in New York rise in price, the tax in Mexico would rapidly eat into earnings. Thus, at 6.50 pesos per dollar, with N. Y. silver at 74.625c. U. S. currency, silver in Mexico has a value of 54.125c., or somewhat less than in July. But, with N. Y. silver at 80c. an ounce, and with the peso at 6.50 per dollar, the value of silver in Mexico after taxes would be only 57.7c.

The Mexican peso coin is now above its melting point, even after allowing for the alloy it contains and the metallurgical problems the alloy involves. At 4.85 per dollar, the melting point of the one-peso piece was 91.62c. U. S. currency per ounce of silver and of the five-peso piece, $1.1877. At 6.50 pesos per dollar, the corresponding melting points were 68.34c. U. S. and 88.59c. U. S. At 7 pesos per dollar, the corresponding two melting points become 63.5c. and 82.3c. respectively.

Although some contend that the current one-peso piece was never so well received as the 5-peso piece, being only 0.500 fine, the Mexican Mint until early August was said to be continuing to mint both coins. With a devalued peso, the silver in the coins doubtless will again have to be reduced, and hence the coins now in the hands of the public and the Bank of Mexico will have to be re-minted.

Variety of Taxes in Force

A list of the taxes which companies in Mexico must pay indicates the problems of doing business there. Official taxes levied exclusively on the mining industry are: The production tax, including tax schedules for metallic minerals, supplementary gold-production tax, tax on non-metallic minerals and ten percent surtax; the surface tax; title, claims and taxes; assay and sampling fees, and inspection charges; and smelting and coining fees. In addition, there are the taxes to which mining and other activities are subject. These include the profits or income tax, the mercantile sales tax, the fees levied on new and going companies; the taxes for social security and for "social benefits" under collective labor contracts, which have the force of law; also general taxes (water, light, vehicles, fuel property, etc., other than those levied by the Federal government).

To the foregoing must be added export duties on minerals and import duties on supplies needed by the mines.

An Embassy Viewpoint

The mining experts of the American Embassy have been making a detailed study of Mexican mining taxes and their effects. The results will soon be made available. As to the effects of the world price changes on the base metals and the depreciation of the peso, these experts feel that output of ore over the short run is likely to be stimulated; but over the long run the mining industry is likely to be injured, unless the present tax law is modified.

While the immediate outlook is favorable for mining enterprises, it is not for custom smelters. There will be problems in getting the increased output of ore to market, because the smelters are working at capacity and coke supply is restricting output. The smelters already have great reserves of ores and, as prices rise, they may have to refuse to accept low-grade ores, which are precisely the ones whose production is likely to be stimulated by higher metal prices.

If this occurs, it will represent on the part of the smelters a departure from past practice and from the mining law.

Alternatively, Embassy experts point out, high-grade ores and concentrates may be exported to the United States. For ores produced far from the border, that will not be feasible, however, especially in the case of low-grade ores, because of the high freight costs and difficulty of obtaining transportation.

Heretofore transportation difficulties have been enormous, with 150,000 to 200,000 tons of ore and concentrates being tied up consistently at railside for lack of railroad equipment. Any additional production will tend to increase the backlogs of minerals awaiting shipment, so it is unlikely that any appreciable quantities of the increased output, consequent upon the stimulus of higher prices, can quickly find their way to market. This situation will result in higher cost of operation and before long the general operating costs of Mexican mining may rise almost to the equivalent dollar levels, it is pointed out.

Moreover, mining experts say, there is every likelihood that the collective contracts recently negotiated with mining labor won't long be observed by the latter, partly because the peso profits of the mines will rise and also because workers' living costs will rise, as they have already started to do with a promptness and to a degree that rather surprises the American visitor.

A point which constantly draws the attention of the visitor to Mexico is the confusing way in which values are measured, now in dollars, now in pesos. Most of Mexico's output of metals comes from foreign-owned mines. These therefore naturally think in terms of their own currencies. In the last analysis, a subsidiary of an American mining company is in business in Mexico only to earn dollars. And, as we have noted above, there is a tendency in Mexico nowadays to think in terms of dollars, as in the official buying and selling of silver.

Since the Mexican system of taxing mine output takes advantage from the Government's standpoint of rises in income in terms of either Mexican or foreign currencies, as the case may be, the mines "get it both ways." Thus, when a foreign mining company points out that the progressive tax on production is taking away its incentive in terms of dollars, the Mexican Government rests its case on the larger income being enjoyed by the company in terms of pesos. It is against this background that one must view the following calculations applying to lead as a result of the N. Y. price increase from 17½c. to 19½c. and the peso decline from 4.85 per dollar to 6.50 at the time of the calculation. On each pound of lead produced in Mexico the mining company gained after taxes 0.21185 pesos, but converting into U. S. currency lost $0.00257!

Labor Watching

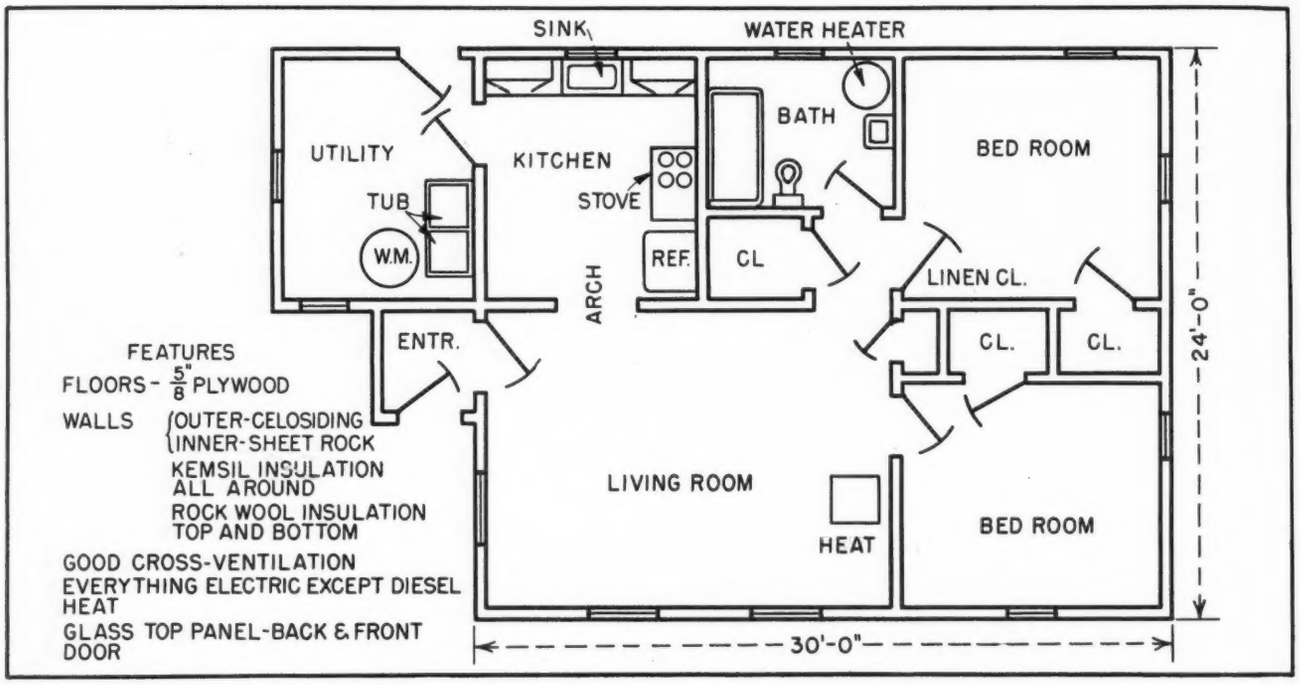
Of the total increase in peso value per pound of lead under these circumstances, some 41 centavos, 20 centavos went to the Government as increased taxes. And labor is eyeing the other 21 centavos. While the peso value of lead had risen 49%, the production and export tax have risen altogether 110%. On a dollar basis, lead has risen 11% in Mexico and the two taxes, 61%.

The tax on lead ore in April, 1948, was 12 centavos per pound of lead content. At present it amounts to about 36 centavos, a rise of 200%.

If the peso should continue declining and/or the prices of metals

to increase, under the present system of a progressive production tax the Government in the end would absorb all the increment. If this seems confiscatory, that is the intention. This is shown both by the text of the law and its history, an old hand at Mexican mining pointed out to me. The export duty which was instituted "temporarily" in 1938, on the occasion of an earlier devaluation of the peso, had as its purpose to capture the so-called unearned increment. The "temporary" tax meanwhile has been supplanted by one that is intended to be permanent.

To the visitor the Mexican mining industry, which provides a large part of all foreign-exchange for Mexico and a substantial portion of total Government revenues, seems to be to a degree the whipping boy in the more nationalistic circles. In common with many other undeveloped countries, Mexico has ambitions to industrialize. For that purpose it will need both large quantities of base metals and an adequate flow income in foreign exchange. It appears that the progressive tax which Mexico now levies on important minerals is self-defeating. It is a deterrent to maximum production of dollar-earning metals today and it augurs ill for the more distant goal Mexico has in mind. A reexamination of the question by the Mexican authorities seems to be called for. Consideration might be given to relying on the income tax for revenue, in place of the production tax, as has been suggested by responsible Mexicans like Ing. Gustavo Serrano, head of the Chamber of Mines (Cámara Minera) and the Mexican Mining Congress which met in Mexico City in March 1948, committees of which now are making detailed studies and recommendations.



Improved Housing Design Suggested

J. WARD DOWNEY, mine superintendent for Westvaco Chemical Corp., Green River, Wyo., read the article on mine camp housing in the August, 1948, issue of *E&MJ* and was prompted to write to us about it. His letter and his suggestion for an improved floor plan are reproduced herewith.

"I enjoyed the article in the August number of your magazine about housing for miners. The idea behind it is highly commendable and the action long overdue.

"The plans of the dwellings to be used are good but exhibit several errors usually fallen into by the amateur architect. I'm only an E.M., too, and can't claim to be an expert, but I have been exposed to some really good house designers. While in the Navy, I found a lot of time on my hands after V-J Day. One of my friends was an architect and through him I met some top flight men of the profession. I became so interested that I read all the books I could lay my hands on. Then I started drawing up my ideas. Finally I ended up making eighth and quarter-scale models. This latter method really shows up the deficiencies in one's designs.

"Shortly after coming here, I had a chance to try out my meager talents. The accompanying drawing shows what I think is a fair way to design a small house for maximum comfort and efficiency. The pitfalls I have tried to evade are such things as: bathtub in front of the bathroom window; too much waste hall space; lack of adequate closet space; long trek from kitchen to dining room; entrance directly into living room; plumbing spread out too far and lack of compactness in kitchen. I have kept the main traffic through the kitchen away from the point where the occupant stands while preparing dinner.

"Although I have indicated no basement or upper story, I think with a little rearrangement I could very easily provide either or both of these."

Careers In Geology

Prepared and Published Under the Auspices of The Division of Geology and Geography National Research Council

A GEOLOGIST at work on an outcrop.

THOSE WHO ARE ATTRACTED by the possibility of a career in pure or applied science should give thoughtful consideration to the practice of geology as a profession. The choice of a profession is a serious problem for a young man or woman. It is a choice which generally must be made at the time of finishing high school. At that time especially it may involve a decision regarding college or university training. The success of a career is probably best measured by the pleasure derived from the environment, whether urban or rural; by enjoyment of one's associates; and by the gratification and happiness that come from living a useful life. To achieve a successful career a young man or woman should select that profession which, as nearly as he can anticipate, will fit his own preferences as to the physical and human setting, preserve his ideals and enthusiasms, and best suit his natural talent and temperament.

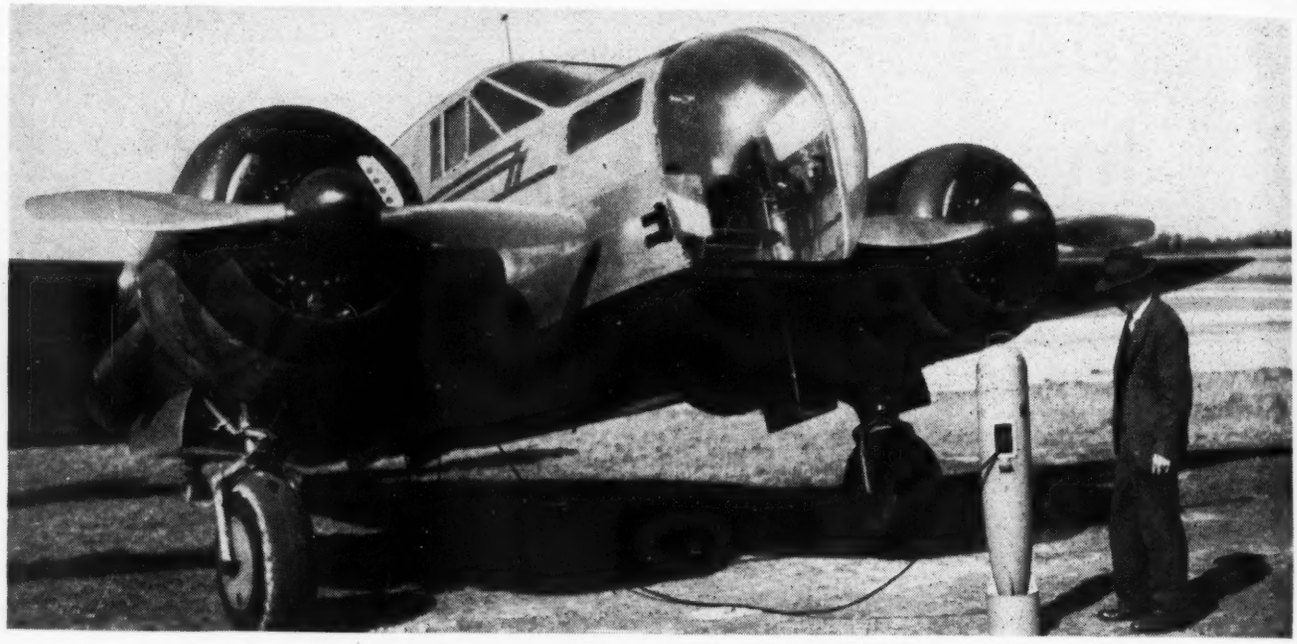
Geology's Wide Scope

Geology combines parts of the other natural sciences. But it is also a field in its own right, offering its own specialties while utilizing the physical and biological sciences to help in the solution of its problems. Geology deals especially with an understanding of the earth, the planet on which we dwell. The geologist is called upon to study the composition of minerals and rocks and must learn to distinguish them; to recognize fossils and reconstruct the ancient life —the huge swimming reptiles, the dinosaurs, toothed birds, the great coal ferns that inhabited the bygone seas and lands; to determine the courses of ancient streams and mountain chains, the boundaries of great seas that once stood where there is now land; and to find and interpret records of the climates of long ago, often strikingly at variance with those of today—like the warm climate in which magnolias thrived in Greenland or the glacial ages in which woolly elephants roamed the United States. In brief, it is the geologist who must decipher the complex story of the earth's past and who may peer, however hesitantly, into its future. These can be called the basic, purely scientific and at times philosophical sides of geology.

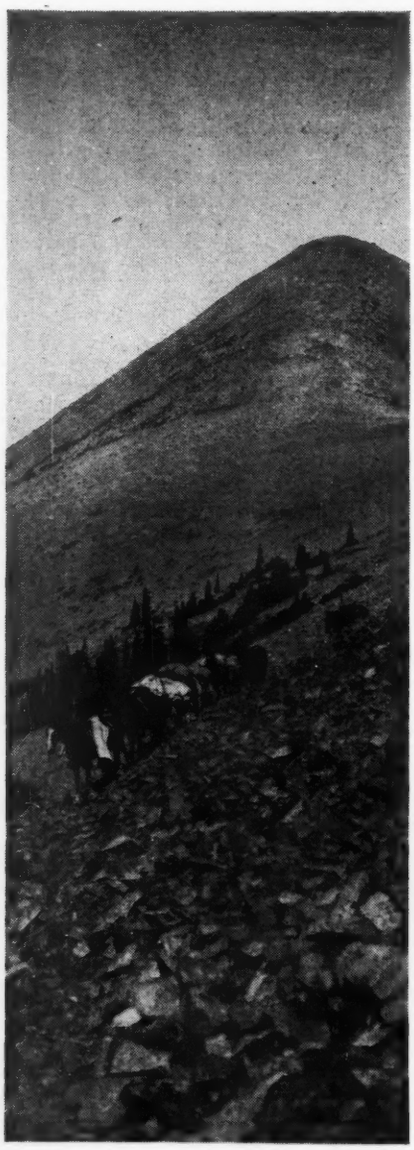
Practical Applications

The geologist can apply his special training and experience to practical subjects and problems as well. His is the key position in the discovery of deposits of the many mineral substances required by our highly industrialized civilization. He plans and executes campaigns in the never-ending search for new oil fields, for previously untouched sources of ores, for undeveloped concentrations of salt and sulphur, of gemstones and coal, of pottery clays and building stone that are needed for special purposes all over the world. As more and more deposits, especially those at or near the surface, are found and exploited, the search becomes increasingly intensive and difficult, the geologist more valuable and necessarily more highly trained. Geologists are likewise asked by engineers to determine where dams may be built without leakage, where the foundations of great buildings and bridges may be safely placed, and where water wells may be drilled with success. During the war they advised on gun emplacement, the water supply of troops, the nature of shores on which landings had to be made from the sea, and the source of strategically important war minerals. Today, in consequence, trained geologists are in greater demand than ever before, in private mineral industries and as public servants in federal and state

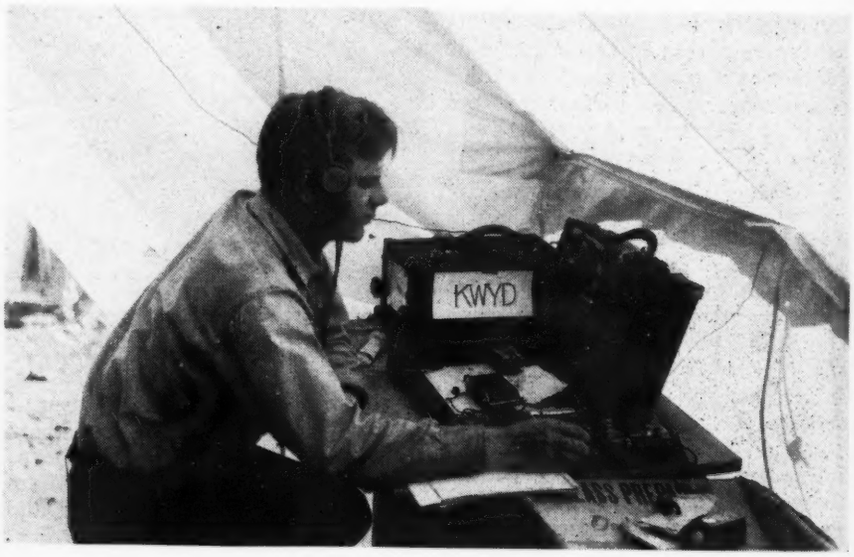
Earning a Living From Adventure—Geologists and Their Equipment in Field



THE GEOLOGIST'S BUGGY in these post horse-and-buggy days.



GEOLOGIST'S PACK TRAIN in the West.

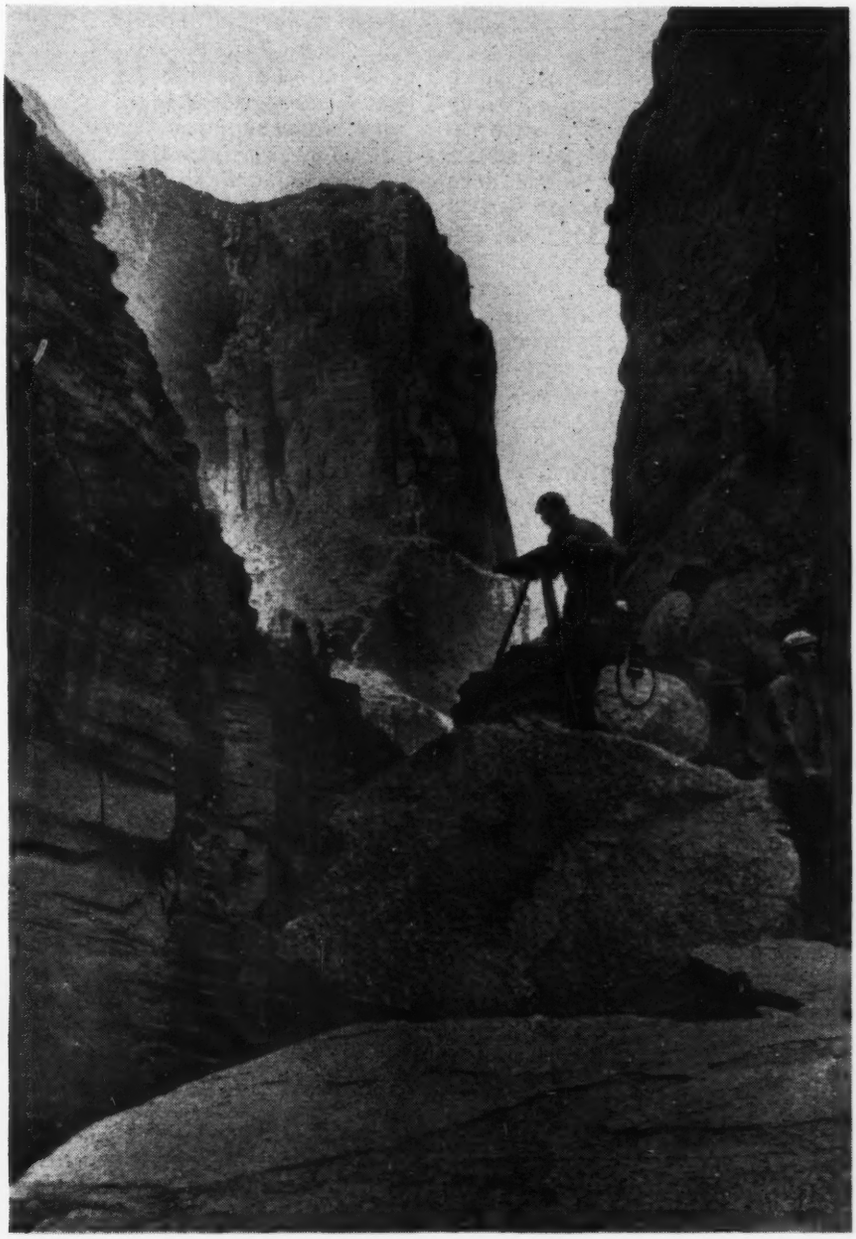


GETTING TIME SIGNALS for geologic observations in Alaska.

BUSH FLYING in the North woods—one way in which geologists ride to work.

EXPLORING for coal with an auger drill.

A MODERN GEOLOGIST.



OPERATING A PLANE TABLE in geologic mapping in canyon country.

GEOPHYSICAL PROSPECTING.

TESTING water for faint traces of useful minerals.

(Continued on next page)

geological surveys and other government agencies.

Geology is so broad a field of work and is related to so many other sciences—physics, mathematics, and chemistry, astronomy, botany and zoology, and even such technical subjects as mining, petroleum and civil engineering and soil mechanics—that the geology student can no longer expect to acquire more than the fundamental principles of the subject during his earlier college years. Sooner or later he must choose a special field of endeavor from the broad scope of geology, according to his greatest supplementary interest.

If he is attracted by physics as a supplementary interest, he may be trained as a geophysicist and devote his efforts to solving the riddles of earthquake waves and measuring the earth's gravity and magnetism. This knowledge can be used to help understand what kind of material is deep under the continents, and how molten rock reaches the earth's surface to form volcanoes. On the other hand, these same general methods may serve to locate petroleum or ore deposits. At present there is a special need for scientists trained in geophysics.

If the young geologist decides to become a geochemist, he may "get in on the ground floor," perhaps, of a fascinating new field dealing with the origin and exploration of deep mineral deposits for which there is no evidence at the surface. Geochemists also study the nature of molten lavas above or beneath the earth's surface. Some are concerned primarily with the relations between putrefying animal and plant remains and the origin of the great mineral fuels, oil and coal; this branch of geochemistry verges on organic chemistry.

Linked With Biology

Geology students may also lean toward the biologic sciences as subsidiary interests. Here geology supplies an outlet in the special fields of paleontology and paleobotany. These phases are concerned with the description and classification of earlier animals and plants and the broader laws of evolution governing their development. By the application of biologic principles, the geologist establishes the orderly sequence of strata, the older ones below and the younger ones above. Where the strata have been tilted, folded, overturned, or otherwise contorted, recognition of such facts has a direct bearing on mineral exploration, or in drilling for oil. Thus, in its biologic aspects, much as in its other phases, geology has both a purely scientific and a more practical value, just as it does in geophysics, geochemistry and mining geology. This is also true of the study of minerals (mineralogy), of rocks (petrology), of ancient land forms (geomorphology), and of the arrangement and deformation of rock masses or strata (structural geology).

Positions as Educators

Geologists occupy important positions on the staffs of colleges, universities and schools of engineering and agriculture, where by their teaching and study of special geological problems they pioneer on the frontiers of knowledge in science and train future generations in their specialty. Many more, however, are employees of state and federal agencies which map the country to show the configuration of the surface (topography), the rocks that appear at that surface (areal geology), and the probable position of such rocks at depth, as an aid in mining activity, engineering construction, farming, and military operations. Many more geologists are employed directly by the mining, petroleum and other mineral industries. In the United States the petroleum companies employ some 6,000 out of a total of about 10,000 professional geologists, including a number of women.

With such work go commensurate rewards in the way of salaries, social prestige and professional recognition, comparable in every way to those attained in other professions. After a well designed four-year course in a college, university or engineering school, the young man or woman may expect a fair beginning salary (for example, in 1947 $200-300 per month), the higher figures being more typical for appointments in foreign fields, the lower for positions in the United States. A preferable training includes five to seven years of undergraduate and postgraduate engineering school, college or university work, carefully planned to include geology, certain other basic sciences (especially mathematics, chemistry, physics and biology), modern languages and perhaps related engineering subjects. This usually leads to an M.S. or M.A. degree (five years) or a Ph.D. (seven years) in geology. Beginning salaries commanded by those holding the higher degrees averaged about $250-350 per month in 1947, but men with experience generally receive appreciably higher salaries than newcomers in the profession. During field work the employer furnishes living and travel expenses. Until recently women have been employed chiefly in mineralogic and paleontologic laboratories, as executives and teachers. For them the salaries average slightly less. Upper ranges of professional standing and of income extend all the way up to those of deanships and presidencies in colleges and universities, directorships and positions as state geologists in public service agencies, and appointments as chief geologists, general managers and high officials of oil or mining companies. Not to be overlooked are numerous consultants who are part-time employees of industry in a profession which, if successfully practiced, is at once useful, interesting and remunerative.

See the World

One aspect of geology should be mentioned as perhaps its greatest asset, though it may be classed by many as a liability. Some jobs in geology include real physical hardships, such as work in the humid tropics or the rugged back-country of Asia or the high Andes. This is an asset or liability, according to the temperament of the person concerned. Many geologists, indeed, lead something of a gypsy-like existence for appreciable parts of their lives. As the geologist thus enjoys an outdoor life which is healthy and hardy, the compensation in that enjoyment itself is large. For the nature lover, the outdoor pursuit of the science provides all he could wish. For the geologist, as for the mining engineer, the physical interest and exhilaration afforded by the most varied landscapes goes with a most exceptional opportunity to see the peoples and cultures of the world—the austerity and dignity of Saudi Arabs, the squat simplicity of the Eskimos on the northern shores of Alaska, the curious and venerable arts of Siam, the colorful, sad-faced Indians of the high Andes in Peru. It may be aptly said, to paraphrase a well-known slogan, "Join the geologists and see the world." These opportunities hold out a stimulating prospect to the student, an exciting, broadening scientific career and a delightful fund of colorful recollections.

HOWARD I. YOUNG
President, American Mining Congress

"Let us do what we can to insure that we are working toward a healthy mining industry that we can take pride in passing along to the next generation."

JULIAN CONOVER
Secretary, American Mining Congress

"To maintain a strong and expanding mining industry, we must recreate a climate under which the risks of exploration, development, research are again justified."

E. S. McGLONE
Chairman, Program Committee, AMC

Bearing as he did the chief responsibility for securing papers for the Congress, Mr. McGlone's success may be judged by the variety and high quality of the program.

Key Industry Problems Are Aired At Mining Congress Convention

UNITED IN A CALL for further strengthening of the Taft-Hartley law and for revision of tax laws to provide incentive for investment in mining, nearly 3,000 members of the mining industry of the United States met in San Francisco Sept. 20 to 25 in the Golden Anniversary convention of the American Mining Congress, Western Division.

In opening the meeting, Julian Conover, Secretary of the Mining Congress pointed out the singular appropriateness of celebrating the 50th anniversary of the Congress in California in the centennial year of the discovery of gold at Sutter's Mill. He went on to declare that even greater tasks faced the mining industry at the time of this meeting than those it had so successfully accomplished in the past.

Minerals for Emergencies

Impact of the government's rearmament and industrial mobilization programs on the domestic mining industry was set forth by Major General C. R. Robinson, executive officer of the National Security Resources Board. He pointed out that any future war will prove a greater drain on our mineral resources than we have experienced in the past, and that sound national mineral policies should be prepared and followed now, so that adequate supplies of minerals will be available in emergencies.

In giving the industry's view on mobilization, Ross D. Leisk, Sunshine Mining Co., recalled some of the mistakes and injustice with which the manpower problem was handled during the last war. He estimated that perhaps 6% of the employees of his company would be subject to call under the present draft, but added that the effect of their removal might be greater than this percentage would indicate. He called for some means of control of movement of miners away from mines to war industries, as a part of any extensive industrial mobilization plan.

The plight of strategic metals producers was considered by industry representatives at a midweek luncheon meeting. Gordon Gould, vice president of H. W. Gould & Co., reported that his company was closing down in quicksilver Oct. 1. The one remaining operation, he believed, "would not last much longer." All chrome mines already have been closed, the meeting was told. Only two manganese producers remain. Four or five tungsten operations are still in business, but no exploration or development work has been done in the last year. Only antimony was in a healthy enough condition so that a new smelter in Idaho is scheduled to go into production in July, 1949.

James Boyd, director of the U. S. Bureau of Mines, stated his belief that some curtailment in the strategic metals field was unavoidable. He declared that the problem was "not insoluble," however, and that he was doing all he could to help work out the solution. He added that while the Government must help, the situation was "primarily a problem of industry."

The Foreign Picture

Evan Just outlined the aims and methods of the Strategic Materials Division of the Economic Cooperation Administration, which he directs. His division is charged with the responsibility for securing for the United States those strategic or critical materials in which this country is deficient. (E&MJ, Sept., p. 70)

As a result of a recent trip abroad, during which he made contracts for a large tonnage of natural rubber and other materials, Mr. Just was able to report some success in counteracting Communist propaganda that the Marshall Plan is only a gesture of American imperialism. He found representatives of European countries willing to cooperate in supplying the United States with needed materials, once they were reassured that this country had no wish to dictate their economic destinies.

Mr. Just pointed out that without the ERP program, metal prices would by this time have shown some weakness that would have been hard to resist in this time of high costs and labor shortage.

In response to questions from the floor, Mr. Just suggested that in certain lines the efforts to aid European mining might eventually bring to this country a flow of materials greater

WORTHEN BRADLEY
Chairman, Western Division, AMC

"Most of us have a strong prejudice against Government aid and/or interference, and a correlative passion for industry's assuming its own burdens wherever possible."

WARREN WHITNEY
Principal Speaker, Anniversary Banquet

"I believe we can learn from American history enough to enable us to perfect a plan that holds promise to the entire world—the American system of opportunity."

PAT McCARRAN
U. S. Senator From Nevada

"An open market for gold would permit individual appraisal of the Government's fiscal and monetary policies without imperiling the credit of the United States."

than our stockpile needs. He suggested that it would be appropriate for the American Mining Congress to meet with the Department of the Interior Mineral Advisory committee to formulate suggested legislative safeguards to prevent possible dumping of such materials on domestic markets if surplus stocks should accumulate.

In estimating the quantity and quality of foreign mineral resources, Mr. Just expressed the view that in relating reserves to demand, foreign countries are no better off than the United States.

P. R. Bradley, Jr., president of the Pacific Mining Co., analyzed the growth and outcome of governmental rule by bureau, and aroused some enthusiasm among his hearers with his bill of particulars against certain varieties of bureaucrats. He did concede, however, that certain bureaus were effective and necessary, mentioning the U.S.G.S. and F.B.I.

Mr. Bradley stated that the majority of men involved in small mining operations felt that the decline in number of such mines in recent years could be laid at the door of Government. He listed the following governmental deterrents to effective mineral production: restrictive tax laws; arbitrary price controls of recent years; adverse tariff actions; uncontrolled imports of metals, citing mercury as an example; application to mining camps of the same social reforms applied to overcrowded cities.

Suggesting the establishment of a tariff authority to replace existing reciprocal trade agreements, Senator George F. Malone, Nevada, stated that the mining and petroleum industries of the nation have been subjected for years to a kind of creeping paralysis of congressional legislation, bureaucratic regulation, and unfair tax burdens. He characterized "reciprocal" as a catchword to sell worldwide free trade to the unsuspecting American people.

Charles H. Dunning, director of the Arizona Department of Mineral Resources, said that tariffs on metals should be suspended, if at all, for no more than a year at a time. He warned that "we should realize that if we let other nations take control over our mineral requirements, history well proves that their cartels will dump metals regardless of cost, if it is politically expedient for them to do so."

Future of Metals

S. D. Strauss, manager of sales for American Smelting & Refining Co., prepared a paper read by R. D. Bradford, in which he pointed out that the future of silver depended on the answers to several questions. He listed as examples: Will the U. S. Treasury continue to buy newly-mined silver? Will India continue its embargo on silver? Will Britain hold or sell silver recovered from called-in silver coins? Will China resume coinage of silver? In general, Mr. Strauss believes that demand and price of copper, lead and zinc in relations to the levels that prevailed prior to the war will continue at a high level for several years.

Stating that "we have no strategic metals industry, only an insignificent stockpile and no assurance of supplies from abroad," S. H. Williston, vice president, Cordero Mining Co., gave a rather pessimistic picture of the present status of strategic mineral production in the United States. He cited import and domestic production figures for manganese, chromite, tungsten, quicksilver and platinum, and deplored the fact that operations that were encouraged during the war were later allowed to die of neglect or were deliberately junked.

Senator Pat McCarran, Nevada, made a powerful plea for a free market in gold as a means of testing realistically the value of a currency. He said that the world today is on a dollar standard, not a gold standard. He thought a "gold market," in which the dollar might freely be appraised, would go far toward achieving currency stabilization throughout the world.

R. W. Bachelor, director of the research council of the American Bankers Association, seconded the proposal for a free gold market during his talk on the outlook for gold in an inflationary era. In a paper read by Neil O'Donnell, Dr. Paul Einzig, London economist, stated that gold is the principal dollar-earning asset of the British Empire. He said that agitation for rejection of the monetary status of gold had practically ceased, and that gold is safer now than at any time in the past.

Problems of Labor

In discussing labor relations, Congressman R. M. Nixon, of California, and Almon E. Roth, president of the San Francisco Employers' Council, reviewed industry's experience during the growth of "big unionism." They set forth some suggestions for changes in the present labor relations law that they felt were indicated in the light of the past year's experience with the Taft-Hartley law. Many of these were incorporated in the resolutions later adopted by the Mining Congress.

W. Ernest Jones presented an enlightened discussion of personnel and public relations problems of the mining industry, which he feels is particularly vulnerable to misunderstanding because of the remoteness of many of its camps and the lack of public knowledge of its problems. Mr. Jones believed the industry has a job to do

JAMES BOYD
Director, U. S. Bureau of Mines

"In the field of mineral resources, aggressive research must play a part in all stages, through exploration, mining, milling, smelting, refining, safety and use."

R. G. PAGE
President, Phelps Dodge Corporation

"Great discoveries of ore . . . were not made by men who knew that if they lost, the loss was theirs, and if they won, the gain belonged mainly to . . . the U. S. Treasury."

EVAN JUST
Director, Strategic Materials Div., ECA

"The responsibilities for resource development written into the Foreign Assistance Act of 1948 provide an opportunity to lay a cornerstone for future world peace."

in cementing better relations between labor and management in mining, in the best interests of both. Better housing, better working conditions, and better understanding of the industry on the part of the public at large were listed by Byron Grant as being the essentials in any campaign to attract better men to the mining industry.

Optimism on Ore Reserves

Speakers at a session on the results of recent exploration and development in adding to ore reserves were uniformly optimistic. In the Northwest, "almost unlimited future expansion of the industry is possible," Carlton D. Hulin, consulting geologist, declared. A confident prediction on new discoveries in the Southwest also was heard, based on the extensive exploration under way in that area. A report prepared by Frank Cameron, vice president of the St. Joseph Lead Co., stated that in the Mississippi Valley and eastern states, "with one or two exceptions, the major producing districts have increased rather than depleted reserves of known ore."

Taxes and Traffic

Several speakers on the tax problems of the mining industry agreed on two things: that some revision of existing tax laws was in prospect; that certain specific revision should be made in order to assist new mining development and protect already operating mines.

Arthur H. Kent outlined several amendments to the present internal revenue code, and advised vigorous and sustained support on the part of all mining industry groups in order to get congressional recognition of the industry's needs in this respect.

In discussing the traffic problems of the mining industry, O. W. Tuckwood called attention to the importance of properly classifying shipments. He cited the case of a company that inadvertently shipped copper-lead bearing metal as scrap iron, and was thereafter served with a summons by the Department of Justice. The company won the case, but lost considerable in legal fees and expenses.

Incentives for Miners

Among the liveliest of the sessions was that devoted to the work of the National Minerals Advisory Council. James Boyd, director of the Bureau of Mines, led off with a summary of the place and the work of the council. He stated that the group was aware of the need for revision of the laws governing mineral lands, and of the need for bettering the incentives for undertaking development of new mines. He pointed out, however, "that virtually the entire industry is agreed that there are insufficient incentives to create a favorable climate for venture capital in mining; yet if there is one field in which virtually the entire industry is in disagreement, it is on what incentives are necessary." He made a strong plea for objectivity and a consideration of the national interest on the part of the mining industry in approaching the problem.

Thereafter, Messrs. S. H. Williston, O. W. Bilharz, R. G. Page, E. R. Lovell, Worthen Bradley, E. H. Snyder and Howard I. Young led a discussion of incentives for mining development. The opinions expressed and defended ranged on the one hand from the view of Mr. Page, president of Phelps Dodge Corporation, that "the most important incentive for a mining company is still the opportunity of making a profit out of an active and efficient mining operation." On the other hand was the opinion of Mr. Lovell, president of Calumet and Hecla, that, for the marginal operator, "inflated wages, supply costs and freight rates are keeping pace with metal prices, and his position remains precarious." Mr. Lovell believes that, to develop significant new reserves of minerals, "the importance of exploration and development incentives cannot be over-emphasized."

E. H. Snyder favored a moderate course in his advocacy of assistance to mining companies in order to get metals into the nation's stockpiles. Mr. Snyder made it clear, however, that he is firmly opposed to government subsidies "to guarantee a profit to the producer of rock."

Public Lands

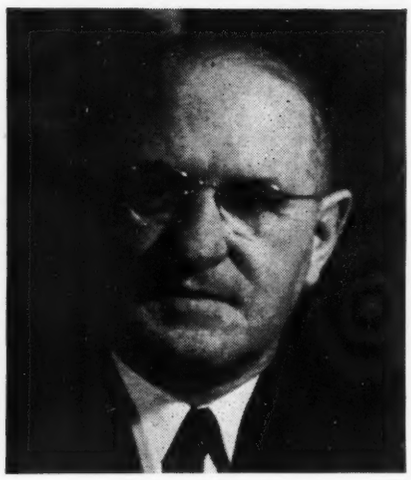
Charles F. Willis presented the views of the Advisory Council's Committee on Public Lands, of which he is chairman. His committee recommends: That competent mining men be placed in the top rank of the Bureau of Land Management; that a study of existing policies and practices be made in order to determine what changes are needed; that existing laws be enforced, and be changed if necessary only by Congress; that development of natural resources by private capital be assisted rather than discouraged; that withdrawn lands revert to the public domain when the purposes for which they were withdrawn have been satisfied; that geophysical work be accepted as a basis for staking a claim and for assessment work; that recording of assessment work be required.

Debate on Crushing

In a technical session on milling, some difference of opinion on the nature of crushing was offered by Messrs. A. W. Fahrenwald, Fred C. Bond and Howard M. Zoerb. Professor Fahrenwald presented data to indicate that a crusher is actually a

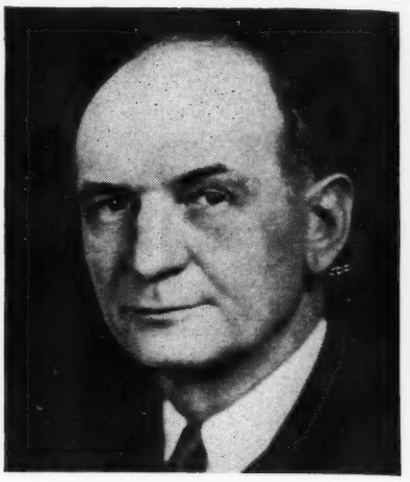
E. R. BORCHERDT
Research Engineer, Anaconda Copper Co.

"The most important requirement for successful mining research is to have someone with an open mind available to the organization to watch for new developments."



E. H. SNYDER
President, Combined Metals Reduction Co.

"The cheapest and best way to recover ore in marginal mines and to insure better-grade reserves in low-cost mines seems to be through direct payments by Government."



J. F. MYERS
Mill Superintendent, Tennessee Copper Co.

"The period of gadgetry in milling is ending and a technique of well-planned and engineered control of milling processes is taking its place."

better grinding medium in some respects than a ball mill. Mr. Bond took the view that this result grew out of the greater energy-to-size ratio for a laboratory ball mill as against a commercial ball mill. Mr. Zoerb explored the definitions of the terms, crushing and grinding, and suggested some characteristics of an ideal instrument of comminution, which he believes is best done in the dry state.

W. L. Zeigler reviewed milling progress, and J. F. Myers, with F. M. Jardine, co-chairman of the session, stated his belief that a rod mill makes the best fine crusher of all.

Automatic Controls

Use of automatic controls in milling is increasing, according to I. M. Le Baron, but he went on to point out that such controls should not be regarded as an end in themselves. They must be justified economically to be acceptable. His paper on the subject outlined several examples of automatic controls now in use in various mills.

Carl Marquardt described an ingenious electronic device for pulp density measurement which makes possible taking of accurate readings of density just under the surface of a pulp, for example, at the point where it flows over the classifier lip. The device could be used for control, but Mr. Marquardt is not yet convinced that completely automatic control at this point is desirable. The accuracy of his instrument has been checked to plus or minus 1/100 units of specific gravity over long periods of time.

R. E. Byler contributed an analysis of the philosophy of automatic controls in milling, a side of the art in which the chemical industries have advanced considerably beyond the mining industry.

Mining Research

During the operating session devoted to mechanization of mining operations and directed by R. J. Mechin, a review of progress in mine mechanization was presented by E. R. Borcherdt. He recommended active research and constant study of new developments and mechanization wherever possible as prerequisites to lower operating costs and safer operations.

D. I. Hayes described a new loading machine known as the self-loading transport for use underground. The machine operates much like a hand shoveler and is powered by a slusher hoist. It will load and transport any free-running material. Loading capacity is much higher than that obtained in conventional scraper operations.

Carbide Bits

The present status and experience in use of tungsten carbide insert bits was outlined by Blair Burwell. Included was an explanation of improvements in construction of the bits and operating experiences with them in Germany, Sweden and several U. S. mines. He stated that the tungsten carbide insert bits will come into their own when drills of lighter weight are available. He pointed out that proper alignment of the drill is of utmost importance if the life of the bit is to be prolonged. As to current operating results Mr. Burwell stated that in very hard rock the life of ordinary steel bits is from 1 in. to 1 ft., in contrast to 8 ft. to 100 ft. for the tungsten carbide insert bit.

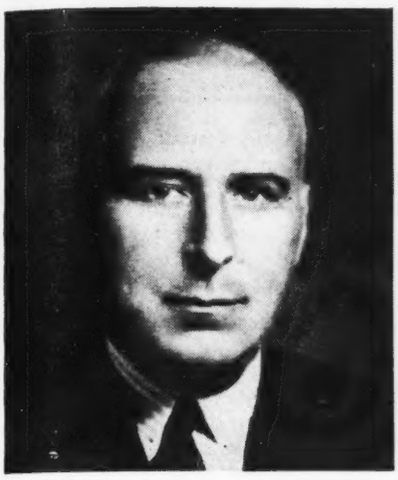
During the following discussion G. T. Harley, in the absence of Joseph H. Taylor and William J. Loach, also gave a favorable account of experience with tungsten carbide insert bits at the properties of Peru Mining Co., in Silver City, N. M., and in the Wolf Tongue mine at Boulder, Colo. Tungsten carbide insert bits drill about 30% of the total ring footage in blast-hole drilling at the Holden mine of Howe Sound Co., as told by J. J. Curzon.

Chester H. Steele told of the exploration, sampling and block caving tests done in twelve block caving zones included in the Greater Butte Project developed by 20,848 ft. of development. The total for all twelve was some 130,000,000 tons of block-caving-type ore containing a minimum of 20 lb. of recoverable copper a ton.

Charles F. Schwab presented an account of the prospecting, sampling and development work done so far in the area in the Bunker Hill mine containing some 5,000,000 tons of 3% lead-zinc ore with ½ oz. silver. The ore zone is 1,000 ft. long and 175 ft. wide. Plans for six blocks have been completed, with Block 1 about 70% completed.

Ralph Newman read an excellent paper (R. W. Lottridge, co-author), on shaft sinking methods employed and equipment used in sinking the Silver Summit, Page, and Galena shafts. He also described the self-loading skip developed at the Bunker Hill mine and to be tried soon in the inclined Bunker Hill auxiliary shaft, and improvements made on the Riddell mechanical mucker to permit one-man operation.

Wesley P. Goss reported that the full extent of the San Manuel orebody in Arizona is not yet known because, having developed 460,000,000 tons, drilling was stopped. A series of holes along the southwest perimeter of the drilling show good columns of ore. The best of these has a column 1,780 ft. thick averaging better than 0.7% copper; the bottom



STANLEY A. EASTON
President, Bunker Hill & Sullivan Mining Co.

"Our present Federal tax structure is an effective deterrent to investment of private capital in mineral exploration and development. It must be revised."

P. R. BRADLEY, JR.
President, Pacific Mining Co.

"The unfortunate tendency of bureaucratic control is inevitably to confine mining production and development to the largest and best mining operations."

S. H. WILLISTON
Vice President, Cordero Mining Co.

"If the Government and the mining industry can agree on broad policy for betterment of the industry, it will not be too difficult to implement that policy."

500 ft. of this column assayed 0.9% copper.

Open Pit Mining

Reasons for changing to open pit methods at the Bagdad, Inspiration, and Ray Copper properties, all in Arizona, were ably explained by A. E. Millar, during his presentation of his paper "Adoption of Open Pit Mining at Three Arizona Properties." In all three instances costs have been lower, tons per man shift increased, and production of a greater tonnage with a lower overall grade of copper.

Tons per man shift at Bagdad have increased from 21 tons underground to 65 plus in open pit; at Inspiration, from 30 to 90 tons; and Ray, from 25 to 89 to 90 tons. In the three operations under discussion, the overall slopes are figured at 45 deg., with the exception of Bagdad, 55 deg.; the cutoff between ore and waste is 0.6% copper; and it may be possible to go to 0.4% as an economic cutoff, provided plant conditions and market price might warrant it, and also provided that this material (between 0.4 and 0.6%) lies within the pit limits and must be removed in any case.

During the ensuing discussion W. H. Goodrich pointed out the roles modern shovel and trucking equipment played in the development of new open pit operations, and reminded the audience that some 20 years back the cutoff point between ore and waste at the open pits varied from 1 to 1½% copper. E. R. Dickie briefly explained the primary crusher and belt conveyor installation in the Bagdad pit. He stated that the cost on installation of the 36-in. belt conveyor was lower than that of trucks. Conveyor transportation of mined ore to the concentrator involves but a distance of 1,000 ft., while truck haulage is ½ mile.

A description of the Bucyrus-Erie drag line and conveyor operations at the South Agnew mine of Butler Bros. near Hibbing, Minn., was given by Earl S. Mollard. He explained preliminary studies conducted to determine the method of exploitation of the property formerly worked by underground methods, dragline operations, and the construction and layout of the portable screening plants and belt conveyor system. (E&MJ, Aug., p. 70.)

Speaking on dredging, H. A. Sawin reported that some of the Yuba Consolidated Goldfields dredges in the Hammonton field dig from 112 to 124 ft. below water against banks 40 to 50 ft. high, and use 18-cu. ft. buckets. Chief recent obstacles to dredging have been unsuccessful attempts to legislate against the industry in California on the basis that dredging destroys farm lands.

Resolutions Adopted

Foremost among the resolutions adopted by the Mining Congress membership were those covering proposed revisions of the Taft-Hartley law. These would outlaw: Strikes not voted by a majority of the employees of a bargaining unit; industry-wide bargaining; any form of compulsory union membership; sympathy strikes or secondary boycotts; NLRB recognition for any union any officer of which is a Communist. Thirteen revisions of the law were suggested in all.

The Congress was against renewal of the reciprocal trade agreement program, and called instead for fixing of tariff rates by congressional action. The group promised cooperation with the Government in accumulating stockpiles, but stated that a healthy mining industry was of far more value to the nation than a stockpile alone.

On public lands, the Congress recorded its opposition to any form of Government leasing system, to certain practices of the Bureau of Land Management; to present rigid requirements as to proof of commercial value of a claim; and to any further moratoriums on annual labor requirement to hold a claim.

Other resolutions called for: Unrestricted holding or sales of gold in domestic or foreign markets; revision of the tax structure; encouragement to investment in mining enterprises; reduction of government expenditures; an end to establishment of further government agencies such as the TVA.

On the matter of subsidies for metals, the Congress, in the national interest, advocated "an incentive program designed to foster exploration for a development of reserves, and to provide incentive for the marginal segment of the mining industry for such period as may be necessary."

The meeting closed with the Golden Anniversary banquet, Sept. 23, where Warren Whitney, vice-president of James B. Clow & Sons, Birmingham, Ala., told members it is time for a "Seventh Inning Stretch." Now, he said, the nation could look back over the last seven innings and renew its faith in the American way of life in preparation for the innings yet to be played.

EQUIPMENT NEWS

Highlights of equipment displays at the 50th Anniversary Meeting of the American Mining Congress will be presented in the November issue of E&MJ.

MARKETS—Trends and Prices

THE STRONG MARKET for major non-ferrous metals continued throughout September. As for some time past, consumers were more concerned with obtaining adequate supplies than with prices. If substitution of other materials for the high-priced metals has taken place the change has not yet been reflected in the market place. Talk in Washington of stepping up the stockpile program through a set-aside or quota system made for increased nervousness among consumers, particularly in the lead division. Higher prices were named during the month for foreign silver, quicksilver, tungsten ore, beryllium ore, manganese ore, ferromanganese, spiegeleisen, and silicomanganese. The E&MJ index of non-ferrous metal prices advanced slightly to 178.26, largely because of higher monthly averages for copper and silver.

Outstanding in developments was the end of the work stoppage at the Southeast Missouri properties of St. Joseph Lead. The 10-weeks' strike reduced the supply of lead mined in this country by fully 25,000 tons. Normal operations and flow of lead from that area is expected by November. Imports were fairly heavy. Demand for lead was brisk. Dealers handling a small percentage of total turnover took advantage of the tight market and obtained premiums over the prices named by domestic sellers. In fact, as high as 24c. per pound was paid for lead in the "outside" market. As the month ended consumers were less disposed to take on premium-priced lead, believing that the supply situation should ease in another month or so.

Domestic consumption of copper during August amounted to 113,987 tons, against 103,316 tons in July. September consumption probably exceeded that of August. The price was firm at 23½c., Valley. Foreign business improved and the equivalent of 23½c., f.a.s. New York, met with no opposition from consumers. Availability of ECA funds no doubt stimulated business.

Demand for silver from industrial users improved.

Major Metals

U. S. DAILY AND AVERAGE PRICES

1948 Sept.	Electrolytic Copper (a) Domestic	(b) Export	Straits Tin New York	Lead New York	Lead St. Louis	Zinc East St. Louis
1	23.200	23.425	103.000	19.500	19.300	15.000
2	23.200	23.425	103.000	19.500	19.300	15.000
3	23.200	23.425	103.000	19.500	19.300	15.000
4	No Market	23.425	103.000	19.500	19.300	15.000
6	Holiday	23.425	Holiday	Holiday	Holiday	Holiday
7	23.200	23.425	103.000	19.500	19.300	15.000
8	23.200	23.425	103.000	19.500	19.300	15.000
9	23.200	23.425	103.000	19.500	19.300	15.000
10	23.200	23.425	103.000	19.500	19.300	15.000
11	No Market	23.425	103.000	19.500	19.300	15.000
13	23.200	23.425	103.000	19.500	19.300	15.000
14	23.200	23.425	103.000	19.500	19.300	15.000
15	23.200	23.425	103.000	19.500	19.300	15.000
16	23.200	23.425	103.000	19.500	19.300	15.000
17	23.200	23.425	103.000	19.500	19.300	15.000
18	No Market	23.425	103.000	19.500	19.300	15.000
20	23.200	23.425	103.000	19.500	19.300	15.000
21	23.200	23.425	103.000	19.500	19.300	15.000
22	23.200	23.425	103.000	19.500	19.300	15.000
23	23.200	23.425	103.000	19.500	19.300	15.000
24	23.200	23.425	103.000	19.500	19.300	15.000
25	No Market	23.425	103.000	19.500	19.300	15.000
27	23.200	23.425	103.000	19.500	19.300	15.000
28	23.200	23.425	103.000	19.500	19.300	15.000
29	23.200	23.425	103.000	19.500	19.300	15.000
30	23.200	23.425	103.000	19.500	19.300	15.000
AVERAGES FOR MONTH						
Sept.	23.200	23.425	103.000	19.500	19.300	15.000
AVERAGES FOR WEEK						
Sept.						
1	23.200	23.425	103.000	19.500	19.300	15.000
8	23.200	23.425	103.000	19.500	19.300	15.000
15	23.200	23.425	103.000	19.500	19.300	15.000
22	23.200	23.425	103.000	19.500	19.300	15.000
29	23.200	23.425	103.000	19.500	19.300	15.000
CALENDAR WEEK AVERAGES						
Sept.						
4	23.200	23.425	103.000	19.500	19.300	15.000
11	23.200	23.425	103.000	19.500	19.300	15.000
18	23.200	23.425	103.000	19.500	19.300	15.000
25	23.200	23.425	103.000	19.500	19.300	15.000

Silver, Gold and Sterling

DAILY AND AVERAGE PRICES

1948 Sept.	Sterling Exchange "Checks"	Silver (c) New York	Silver London	Gold London	Gold (d) United States
1	402.750	74.750	45.000d.	172s. 3d.	$35.00
2	402.750	75.000	45.500d.	172s. 3d.	35.00
3	402.750	75.250	45.500d.	172s. 3d.	35.00
4	(e)	(e)	(e)	(e)	35.00
6	Holiday	Holiday	46.000d.	172s. 3d.	35.00
7	402.750	75.250	46.000d.	172s. 3d.	35.00
8	402.750	75.250	46.000d.	172s. 3d.	35.00
9	402.750	75.250	46.000d.	172s. 3d.	35.00
10	402.750	75.250	46.000d.	172s. 3d.	35.00
11	(e)	(e)	(e)	(e)	35.00
13	402.750	75.250	46.000d.	172s. 3d.	35.00
14	402.750	75.250	46.000d.	172s. 3d.	35.00
15	402.750	75.250	46.000d.	172s. 3d.	35.00
16	402.750	75.250	46.000d.	172s. 3d.	35.00
17	402.750	75.250	46.000d.	172s. 3d.	35.00
18	(e)	(e)	(e)	(e)	35.00
20	402.750	75.250	46.000d.	172s. 3d.	35.00
21	402.750	75.250	46.000d.	172s. 3d.	35.00
22	402.750	75.250	46.000d.	172s. 3d.	35.00
23	402.750	75.250	46.000d.	172s. 3d.	35.00
24	402.750	75.250	46.000d.	172s. 3d.	35.00
25	(e)	(e)	(e)	(e)	35.00
27	402.750	75.250	46.000d.	172s. 3d.	35.00
28	402.750	75.750	46.000d.	172s. 3d.	35.00
29	402.750	76.250	46.000d.	172s. 3d.	35.00
30	402.750	76.500	46.500d.	172s. 3d.	35.00
AVERAGES FOR MONTH					
Sept.	402.750	75.345	45.932	—	$35.00
AVERAGES FOR WEEK					
Sept.			—	—	
1	402.750	74.000	—	—	
8	402.750	75.188	—	—	
15	402.750	75.250	—	—	
22	402.750	75.250	—	—	
29	402.750	75.550	—	—	

Calendar week averages: New York Silver: Sept. 4th, 74.650; 11th, 75.250; 18th, 75.250; 25th, 75.250.

(e) Not quoted (Saturday).

THE above quotations for major non-ferrous metals are our appraisal of the important United States markets, based on sales reported by producers and agencies. They are reduced to the basis of cash, New York or St. Louis. All prices, except gold and silver, are in cents per pound.

(a) Net prices at refineries on Atlantic seaboard. To arrive at the delivered New England basis add 0.300c. per pound, the average differential for delivery charges.

(b) Our export quotation for copper reflects prices obtaining in the open market and is based on sales in the foreign market reduced to the f.o.b. refinery equivalent. Atlantic seaboard. On f.a.s. transactions we deduct 0.075c. for lighterage, etc., to arrive at the f.o.b. refinery quotation.

Copper, lead and zinc quotations are based on sales for both prompt and future deliveries; tin quotations are for prompt delivery only.

Quotations for copper are for the ordinary forms of wirebars and ingot bars; cathodes are sold at a discount of 0.125c. to 0.15c. per pound.

Quotations for zinc are for ordinary Prime Western brands. Zinc in New York commands a premium over the St. Louis basis equal to the freight differential. Contract prices for High Grade zinc delivered in the East and Middle West in nearly all instances command a premium of 1c. per pound over the current market for the Prime Western but not less than 1c. over the *Engineering and Mining Journal's* average quotation for Prime Western for the previous month; the premium on Special High Grade in most instances is 1¼c.

Quotations for lead are for common lead. Corroding lead commands a premium of 10 points.

(c) Determined by Handy & Harman on the basis of market prices for bar silver, in cents per troy ounce .999 fine, in amounts of 50,000 oz. or more, nearby delivery, New York. Price quoted is in cents and one-eighth cent fractions and is usually about one-quarter cent below the market to allow for delivery, carrying, and marketing. In addition to foreign silver, the quotation also applies to domestic and Treasury silver if such silver enters into the market. The Treasury's purchase price of newly mined domestic silver 90.5c. per troy ounce 1000 fine, effective July 1, 1946. London silver in pence per troy ounce, basis .999 fine.

(d) U. S. Treasury's gold price. Actual payment by the United States Treasury for gold is at 99.75 per cent of the price quoted by the Treasury, which is equal to $34.9125.

MARKETS—Trends and Prices

Miscellaneous Metals

(Monthly Averages)

Average prices of miscellaneous metals for August and September:

	Aug.	Sept.
Quicksilver, N. Y., flask...	75.000	75.040
Antimony (a)	38.170	38.170
Antimony, bulk, Laredo...	35.000	35.000
Antimony, in cases, Laredo	35.500	35.500
Antimony, Chinese (b)...	....	....
Platinum, oz. troy	93.000	93.000
Cadmium (c)	190.000	190.000
Cadmium (d)	195.000	195.000
Cadmium (e)	200.000	200.000
Aluminum, ingot	16.000	16.000
Magnesium, ingot	20.500	20.500

(a) New York, packed in cases, in lots of 5 tons or more but less than a carload. (b) Nominal. (c) Producer's price for commercial sticks. (d) Average producers' and platers' quotations. (e) Special shapes sold to platers.

E. & M. J. Weighted Index of Non-Ferrous Metal Prices

(100 is composite for 1922-3-4. Copper, Lead, Zinc, Tin, Silver, Nickel, Aluminum)

1938.....73.67		1943..... 88.74	
1939.....77.71		1944..... 88.74	
1940.....79.22		1945..... 90.86	
1941.....83.49		1946.....110.06	
1942.....86.80		1947.....149.46	
	1946	1947	1948
January	96.42	140.88	154.20
February	96.42	140.42	155.63
March	96.42	150.71	155.63
April	96.42	153.14	160.67
May	96.42	154.03	161.33
June	107.16	150.05	162.30
July	117.11	148.73	164.55
August	113.32	149.35	177.68
September ...	113.32	150.80	178.26
October	114.25	151.05	....
November ...	131.23	151.92	....
December	142.19	152.48	....

Official London Prices

Since Dec. 18, 1939, the British Ministry of Supply has named maximum delivered prices for the major non-ferrous metals. Delivered prices for consumers in the United Kingdom effective Oct. 1, 1948, follow:

	Per Long Ton		
	£	s.	d.
COPPER:			
Electrolytic, high conductivity	140	0	0
Fire refined, high conductivity	140	0	0
Fire refined, high grade	139	10	0
Fire refined, min. 99.2 percent	139	0	0
Fire refined, min. 99.7	138	10	0
Hot rolled black wire rods	146	0	0
LEAD:			
Soft, foreign, duty paid	112	0	0
Soft, Empire	112	0	0
English refined	113	10	0
ZINC:			
Foreign (G.o.b.), duty paid	92	0	0
Domestic (G.o.b.)	92	0	0
Prime Wester nand debased	92	0	0
Refined and electrolytic	92	15	0
Minimum 99.99 percent	94	5	0
TIN:			
Ingot, 99 percent	569	0	0

Miscellaneous Metals, Ores, Minerals

Quotations cover wholesale lots, prompt shipment, f.o.b. New York unless otherwise stated

MISCELLANEOUS METALS

(Sept. 30, 1948)

Aluminum, ingot, 99 plus percent, lb. (base price)	16c.
Antimony, spot, lb., 5 tons and up but less than carload, in cases	38.17c.
Bismuth, ton lots, lb.	$2.00
Cadmium, commercial sticks, lb.	$1.90
Calcium, lb., ton lots, 98 percent, cast	$1.95
Chromium, 97 percent grade, lb., spot	$1.02
Cobalt, 97 to 99 percent, per lb.	$1.65
Indium, troy oz.	$2.25
Nickel, electrolytic cathodes, lb., f.o.b. Port Colborne (a)	40c.
Magnesium, 99.8 percent, carloads, lb., producer's plant	20½c.
Palladium, troy oz.	$24.00
Platinum (Official quotation wholesale lots), troy oz.	$93.00
Quicksilver, flask of 76 lbs., 25 flasks or more	$76.00
Selenium, 99.5 percent, lb.	$2.00
Silicon, minimum 97 percent, spot, carloads, lb.	16.50c.
Tellurium, lb.	$1.75 nom.
Thallium, 100 lb. or more, lb.	$15.00
Titanium, 96 to 98 percent, lb.	$5.00@$6.00

(a) Includes U. S. duty.

METALLIC ORES

Beryllium Ore, 10 to 12% BeO, f.o.b. mine, per unit	$24.00@$26.00
Chrome Ore, per long ton, f.o.b. cars Atl. ports, dry	
48% Cr_2O_3, 2.8 to 1 ratio	$34.00@$35.00
48% Cr_2O_3, 3 to 1 ratio	$38.00@$42.00
Iron Ore, Lake Superior, Lower Lake ports, long ton:	
Old Range bessemer	$6.60
Mesabi bessemer	$6.35
Old Range non-bessemer	$6.45
Mesabi, non-bessemer	$6.20
Lead (Galena), 80 percent, Joplin, Mo., ton	$257.37
Manganese Ore—Per long ton unit of Mn. basis 48 percent manganese, subject to premiums and penalties, f.o.b. cars Atlantic and Gulf ports, duty paid, 70.6@72.6c. Prices nominal.	
Molybdenum Ore, 90%, per lb. of MoS_2 f.o.b. mines	45c.
Tantalite, 60% concentrate, per lb.	$2.00@$2.75
Tungsten Ore, per unit of WO_3:	
Foreign, 60 percent, duty paid	$24.00@$24.50
Domestic, scheelite, 60 percent and upward	$28.00
Vanadium Ore, per lb. of contained V_2O_5 f.o.b. mines	27½c.
Zinc Ore, Prime, 60 percent concentrate, Joplin, Mo., per ton	$95

METALLIC COMPOUNDS

Arsenious Oxide (arsenic trioxide) lb., in bbl., carload lots, delivered	6¼c.
Cobalt Oxide, 70 to 71 percent, lb., ceramic grade	$1.27@$1.30
Copper Sulphate, 100 lb.	$8.10

ALLOYS

Beryllium Copper, 4 percent Be, per lb. of contained Be	$20.50
Ferrochrome, 65 to 69 percent, per lb. of Cr contained	18.60c.
Ferromanganese, 78 to 82 percent, gross ton	$160.00
Ferromolybdenum, 55 to 65 percent Mo, lb. of Mo, contained	95c.
Ferrosilicon, 50 percent, per lb. of contained Si	10.5c.
Ferrotungsten, 75 to 80 percent, lb. of W contained	$2.25
Ferrovanadium, per lb. of V delivered	$2.90
Silicomanganese, 1½ percent C, per lb. contracts	8.6c.
Spiegeleisen, per long ton, 19@21%	$62.00

NON-METALLIC MINERALS

Asbestos, f.o.b. Canada (Quebec) mines (U. S. funds), ton:	
Crude No. 1	$896@$960
Crude No. 2	$350@$545
Spinning fibers	$204@$378
Paper stock	$51@$78
Shorts	$24@$46
Vermont, f.o.b. Hyde Park:	
Shingle stock	$97.00@$107.00
Paper stock	$68.50@$85.00
Waste	$51.00
Refuse or shorts	$25.50@$46.50
Barytes, f.o.b. mines:	
Georgia, crude, per long ton	$11.50@$12.00
Missouri, 93 to 94 percent $BaSO_4$, per short ton	$9.00@$9.25
Bauxite, long ton:	
Domestic, crude, 50 to 52 percent (not dried)	$4.00@$5.00
Domestic, chemical, 55 to 58 percent	(a)$8.50@$9.00
Domestic, abrasive, 80 to 84 percent	$17.50@$18.50
China Clay, f.o.b. mines, ton:	
South Carolina and Georgia, No. 1, airfloated, bulk	$8.00@$9.00
North Carolina, ceramic grade	$18@$22
Feldspar, bulk ton:	
Potash feldspar, 200 mesh	$17.00
Glass spar, white, 20 mesh	$11.75@$12.50
Fluorspar, f.o.b. mines, bulk, Kentucky and Illinois, 70 percent, all rail movement, ton	$35.00
Acid 97.5 and 1 percent, bulk, ton	$42.00
Fuller's earth, f.o.b. Georgia or Florida, ton	$7.00@$14.00
Magnesite, per ton dead-burned, f.o.b. Washington	$31
Mica — Domestic f.o.b. mines. Punch, 12 to 18c. per lb. according to size and quality. Sheet, clear, 1½ x 2 inch, 60 to 65c.; 2 to 2 inch, 95c. to $1; 2 x 3 inch, $1.35; 3 x 3 inch, $1.80; 3 x 4 inch, $2.25; 3 x 5 inch $3.; 4 x 6 inch, $4; 6 x 8 inch, $6. Wet ground, very fine, $135@$175 per ton. Bulk sales, dry ground, $40@$80 per ton. Scrap, $25 and up.	
Ocher, Georgia, ton, in sacks	$24.00
Pyrites, Spanish, per long ton unit of S, cif. Atlantic ports	(a)12@14c.
Sulphur, Texas, mines, long ton	$16.00@$18.00
Talc, f.o.b. works, ton:	
New York, purified	$18.50@$20.00
Vermont, extra white	$12.50
Tripoli, Missouri, ton:	
40 mesh, cream colored	$14.50

(a) Nominal.

IRON AND STEEL

Pig iron, Valley furnaces, gross ton: Basic	$43.00
Steel, f.o.b., Pittsburgh billets, net ton	$52.00
Structural shapes, 100 lb.	$3.25

WASHINGTON REFLECTIONS

McGraw-Hill Washington News Bureau

Colonial Development Cited To Increase Mineral Output

Evan Just, director of ECA's Strategic Materials Division, told the American Mining Congress meeting in San Francisco, Sept. 20, that "the programs (to increase the flow of materials in which the U. S. is deficient or potentially deficient) being formulated are not allotting sufficient funds for colonial development—and it may be necessary to request changes (in the law) or to earmark special funds for resource development."

Congress did earmark 5% of the grant money going to ECA countries, in local currencies, for strategic materials and other local currency requirements of the U. S. Mr. Just pointed out that these funds are used partly for procurement of strategic materials—those lying on the ground —for the military stockpile, partly for administrative costs, and that the remainder is insufficient to finance adequate development projects.

The answer here, according to Mr. Just, is to encourage American private capital aid in eliminating bottlenecks and expanding foreign production. The law provides special dollar funds which may be used to guarantee the convertibility of American investments in the dollar-weak countries.

However, there is a reluctance of American capital to participate in foreign resource development programs when it is evident that the prospect for profit, at least in early years, is uninviting.

The only alternative, in Mr. Just's opinion, is "to provide some government agency with power to participate in publicly desirable foreign developments where private capital refuses to take the chance—or to license private agencies on a fee basis." The director adds, "I hope that any legislation to this end will provide for relinquishment to private hands whenever a willingness to take over develops."

Observers in Washington believe, however, that legislation "putting the Government into the development business and competing with American mining interests—with their own money" will run into considerable opposition in Congress.

One other weakness in the ECA noted by Mr. Just, was the failure to provide for an agency to receive and dispose of acquired strategic materials in an orderly fashion that assures that the domestic market will not be upset. Accordingly, he suggested that the American Mining Congress request safeguards of Congress which "would prevent the dumping of materials on the American market."

In conclusion, he said, "if we can prove our ability to participate in the development of strategic materials abroad to the mutual benefit of the foreign countries and ourselves, without exploitation, we will be able to make a significant contribution to peace."

Mr. Just and his staff, on a recent trip to London, The Hague, and Paris, started negotiations to expand shipments of graphite, manganese, mica, lead, cobalt, bauxite and asbestos from the British, French and Dutch colonies to the U. S. Financial settlements will involve both dollars (future payments for stockpile materials) and earmarked local currencies.

Because more than 20% of U. S. requirements of metallurgical manganese is imported from Russia, and Russia has reportedly used this fact in Moscow political talks, a plan to speed manganese imports from India and Africa is being suggested to the National Security Resources Board. Under the proposed plan, one man of a three-man expediting team would go to India, another to Africa, and a third man would remain in Washington to eliminate "red tape". The proposed expediters would be empowered to go over the heads of other government agencies—State Dept., Commerce Dept., ECA, etc.—direct to foreign mining and transportation executives, and to guarantee transportation, equipment and machinery to those projects which could show definite ability to increase the production of strategic materials.

Advisory Council Reports Mine Equipment Needs

A special advisory committee to the National Minerals Advisory Council, working with the Bureau of Mines, has estimated in a report that the metallic and non-metallic mining industries in the United States will need more than $122,700,000 worth of machinery in 1949. Non-ECA exports call for an additional $11.2 million worth.

The report, which sets forth the quantities of steel required for the manufacture of mining machinery and repair parts essential to the industry, is intended as the basic argument for allocations of steel under the "voluntary allocations program" of the Office of Industry Cooperation of the Department of Commerce. OIC was established by the Taft Act (Public Law 395) passed during the fall session of the 80th Congress.

Steel to produce the two classes of machinery needed by the industry next year totals 259,000 tons, of which 196,000 tons in carbon steel and 63,800 tons is alloy. An additional 21,400 tons is needed for export to countries outside the Marshall Plan sphere, according to the report.

Types of machinery and equipment (dollar values) needed for metallic and non-metallic mines, during 1949*

Equipment	Metal Mines	Non-Metal Mines	Total (1943 prices)
Crushers	$ 5,420,000	$ 2,730,000	$ 8,150,000
Haulage equipment	1,920,000	1,210,000	3,130,000
Coal cutters	.....	40,000	40,000
Underground conveyors	33,000	27,000	60,000
Mine hoists	2,450,000	110,000	2,560,000
Mine loaders	2,840,000	690,000	3,530,000
Ore and coal prep. equip.	5,010,000	2,010,000	7,020,000
Smelting and refining	4,610,000	.....	4,610,000
Specialized mine equip.	3,210,000	1,940,000	5,150,000
Drills	1,500,000	500,000	2,000,000
Surface conveyors	4,600,000	8,680,000	13,280,000
Compressors	1,250,000	980,000	2,230,000
Mine fans and blowers	220,000	80,000	300,000
Ore cars	2,710,000	.....	2,710,000
Pumps	1,920,000	1,040,000	2,960,000
Rock drills	2,750,000	980,000	3,730,000
Power shovels	3,040,000	2,370,000	5,410,000
Misc.	1,910,000	4,900,000	6,810,000
Totals	$45,400,000	$28,300,000	$73,700,000
Repair parts	28,000,000	21,000,000	49,000,000
Grand total	$73,400,000	$49,300,000	$122,700,000
Exports	7,400,000	3,800,000	11,200,000
TOTAL ALL	$80,800,000	$53,100,000	$133,900,000

*Committee investigators used the 1943 totals as a base, and applied increases of 18% for metal mines and smelters, and 42% for non-metallic mines to determine 1949 values. The Bureau of Labor Statistics estimated that the increase of mining machinery costs for 1949 as compared with 1943 would be about 30%. The above figures do not include power units (diesel and gas engines), electrical equipment, surface locomotives, tractors and automotive trucks, all of which are widely used in the industry but not designed specifically for use in mining.

SAFE DEPENDABLE POWER

Battery-powered haulage units and EXIDE-IRONCLAD® BATTERIES

Time-saving...cost-cutting combination

Battery-powered trammers, locomotives and shuttle cars keep high production on the move. And the pace is maintained day after day . . . with full-shift availability when Exide-Ironclad Batteries supply the power.

That's because Exide-Ironclad Batteries have *all* four of these vital characteristics of a storage battery—high power ability, high electrical efficiency, ruggedness and long life . . . assuring years of safe, dependable, day-in day-out haulage service.

For peak performance and maximum economy, give your haulage jobs to battery powered units and Exide-Ironclad Batteries.

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THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • *Exide Batteries of Canada, Limited, Toronto*

NEWS OF THE INDUSTRY

Armco, Inland, Wheeling and Hanna Companies Purchase Large Interest in Butler Brothers

Sale of a substantial interest in Butler Brothers, Minnesota iron ore operator, has been made to a group composed of Armco Steel Corp., Inland Steel, Wheeling Steel Corp., and Hanna Coal & Ore Corp., subsidiary of M. A. Hanna Co. Butler Brothers' business will be continued under the same name by the same operating personnel. The Hanna company will assume all supervision and management, as agent, for the interested parties.

Butler Brothers' headquarters are in St. Paul. Their operating office is at Cooley, Minn., on the Mesabi. This year they have been operating five groups of mines on the range, shipping approximately 3 million tons. In addition, they have large undeveloped reserves on the Mesabi, also on the Cuyuna Range.

In addition to the Butler properties, various undeveloped properties owned by Hanna Coal & Ore Corp. will be included in the arrangement. Subject to fulfillment of outstanding contracts of Butler Brothers, this tonnage in the future will be available to the steel companies participating in the purchase and will constitute a substantial addition to their raw material reserves.

Butler Brothers, one of the successful independent iron ore operators, grew out of a contracting business founded in 1894 by five brothers. The contracting company built many office buildings, hospitals, colleges, ore docks, breakwaters, tunnels and government buildings, including the Minnesota and North Dakota state capitols, the Detroit-Windsor railroad tunnel and the Federal Building in St. Paul. Shortly after 1900 they began to take contracts to develop iron ore properties in the Lake Superior region. They subsequently acquired ore properties of their own, and in 1914, their first year of production, shipped 206,000 tons of ore. Since then they have shipped about 60,000,000 tons. By 1920 the organization was devoting all of its efforts to the iron ore business and has been so engaged since then.

Kennco Canadian Project Includes Titanium Smelter

A program expected to have far-reaching influence on metallurgical developments in Canada has been undertaken by the Kennco Exploration, Ltd., owned jointly by Kennecott Copper Corp. and the New Jersey Zinc Co. An initial expenditure of $25 million is planned to develop the recently discovered deposits of titanium ore on the shore of Lake Tio, Province of Quebec, estimated at 125 million tons. The ore averages about 35% titanium oxide and 40% iron.

A $15 million smelter, with initial capacity of 1,500 tons of ore a day is to be constructed at Sorel, Que., between Montreal and Three Rivers. Plans have been completed by the Quebec Iron & Titanium Corp., controlled by the Kennecott and N. J. Zinc companies, and the smelter is to be operating by 1951.

Eventually expenditure for development of the Kennco project is set at $150 million.

Ashland, Ky., Pilot Plant to Make Iron Pellets

As part of an industry-wide effort to utilize low-grade iron ore and taconite, Reserve Mining Co. started the building of a pilot plant for pelletizing iron ore concentrates about a year ago. Expected to be in operation this fall, the new pilot plant at Ashland, Ky., will be used to determine the best method of putting ore concentrate into balls or pellets, and what type and size will be most suitable in production of iron and steel.

At Ashland the Armco Steel Corp., who owns a third of Reserve Mining Co.'s stock, has three blast furnaces and several open hearths and will use pellets from the pilot plant in experiments. First pelletizing will be from ore concentrates with about 67% iron content, purchased from the Benson mine of Jones & Laughlin Steel Corp., in New York state. This will obviate the necessity of building taconite concentrating plants before pelletizing experiments can start.

Reopening of Zinc Mines Progresses on Schedule

To speed up shaft sinking, a temporary headframe has been erected at the Friedensville mine, now being reopened by the New Jersey Zinc Co. Permanent headframe will be started after full shaft depth is reached. An engineer of the company stated that 100 ft. a month would be considered a fair rate of sinking progress; 150 ft. or more, excellent. The concrete shaft collar extends 57 ft. from surface to the solid rock beneath. The shaft was to be encased in 12 to 18 in. of concrete wherever required by rock formation, and all supporting members were to be constructed of steel for maximum safety. Upon completion of the shaft, 12,000 to 15,000 ft. of tunnels and raises will be excavated.

Ore is to be crushed at the foot of the shaft, then hoisted for further treatment before shipment to the company's largest manufacturing plant at Palmerton. Construction of surface plants were expected to begin this fall.

St. Jo Employees Organize; Men Go Back to Work

Operations of the St. Joseph Lead Co., at a standstill since negotiations were halted in July because of the Communist issue, had not resumed early in September. But the company was somewhat encouraged by the progress of the Ozark Lead Worker's Association, set up by a group of employees to get the miners back to work.

A drive was instigated to obtain a sufficient number of signatures to permit the group to represent the workers in negotiating wage agreements and other conditions of employment under the National Labor Relations Act. The Association had forwarded registration papers to the U. S. Department of Labor, filed non-Communist affidavits, and complied with all other requirements.

The Ozark Lead Worker's Association carried a full-page ad in local papers denouncing Maurice Travis and Reid Robinson, international officers of IUMMSW, for following the Communist line, and setting forth as a purpose of the new Association "to bring out the truth as we believe a lot of the employees do not know the truth."

On Sept. 17 about 300 workers at Mine La Motte (IUMMSW, CIO) returned to work without a contract. This move spread to remaining strike-bound St. Joe operations during the following week when members of Local 648 (CIO) voted to resume work without a contract. Elections to determine the bargaining agency for workers were scheduled for late September. Because officers of IUMMSW had not signed non-Communist oaths, that union could not appear on the ballot. However, the recently organized OLWA, and the United Gas and Chemical Workers (CIO) which had complied with the oath requirements were eligible to appear.

STANDARD ENGINEER'S REPORT

RPM CALOL

TEST DATA

UNIT 6 cyl. gas Truck + Bus Engine

LUBRICANT RPM Heavy Duty Motor Oil

FUEL Chevron Gasoline

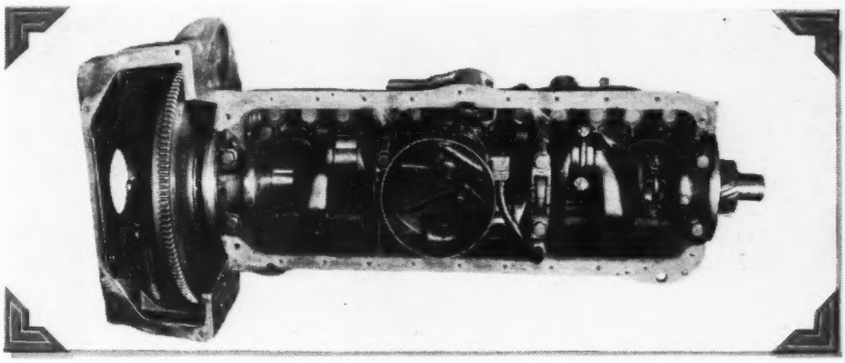
CONDITIONS max. engine loads for prolonged periods

FIRM Mountain Auto Line

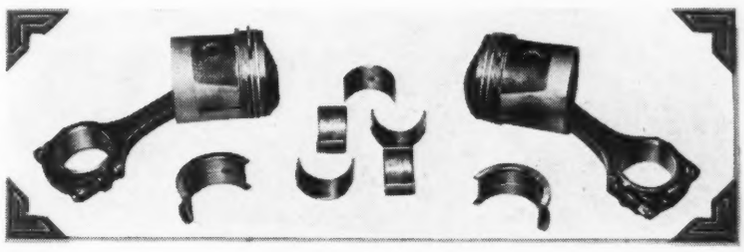
LOCATION San Bernardino, Calif.

TOUGHEST MOUNTAIN SERVICE PROVES RPM HEAVY DUTY KEEPS TRUCK AND BUS ENGINES CLEAN

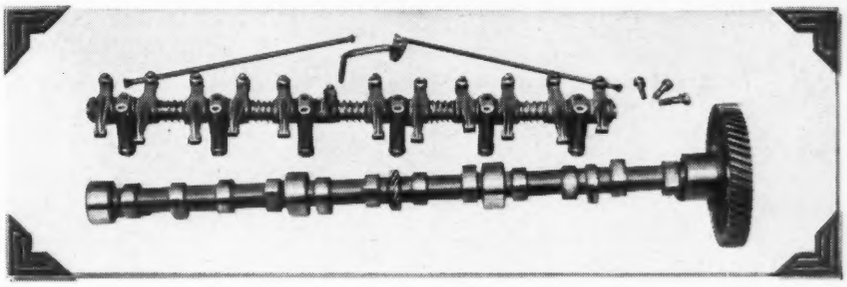
When this engine was pulled out of service for inspection, and the photographs were taken, it had operated on RPM Heavy Duty Motor Oil continuously for 45,000 miles—in service that is about as hard on equipment as any in the country. It is one of 21 units used on a mountain bus and freight run. They climb to a 5000-foot altitude in 15 miles without a stop. Even with 6-bladed fans, pressure-lubricated timing gears and 10-speed transmissions, crankcase temperatures soar above 240 degrees F.



As the pictures at right and above show, the crankshaft, bearings, pistons and rings from the engine were exceptionally clean. RPM Heavy Duty Motor Oil withstands the highest operating temperatures . . . sticks to the hot spots ordinary oils leave bare.



The camshaft was free from lacquer. Pushrods, timing gears and other parts showed minimum wear. RPM Heavy Duty Motor Oil resists oxidation, cleans engines of lacquer and maintains a tough lubricating film. It does this because of inherent properties of its selected base stocks and special compounds.



REMARKS: Many oils, competitive to RPM Heavy Duty Motor Oil, have been tested by Mountain Auto Line in their regular service. Tests have been made in all seasons of the year with atmospheric temperatures ranging from zero to 100°F. above zero in the shade. RPM Heavy Duty Motor Oil is the only oil used that meets every requirement of their engines and prevents clogging with lacquer.

STANDARD TECHNICAL SERVICE conducted and reported this test: If you have a lubrication or fuel problem, your Standard Fuel and Lubricant Engineer or Representative will give you expert help; or write Standard of California, 225 Bush Street, San Francisco 20.

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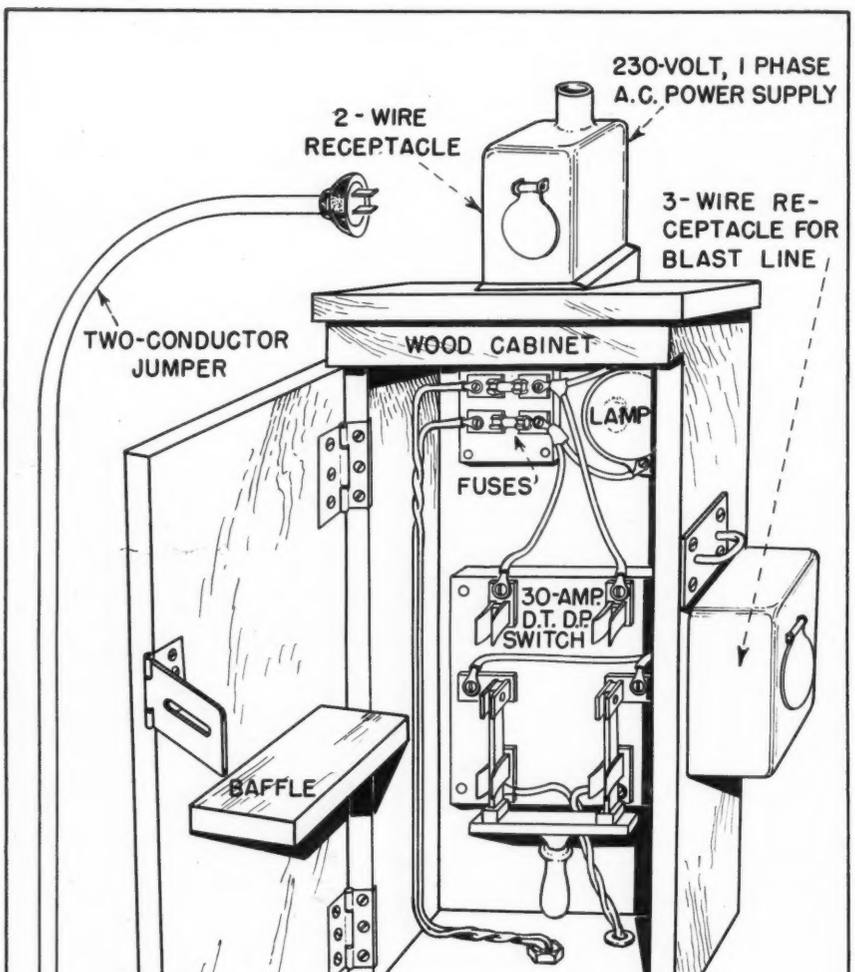
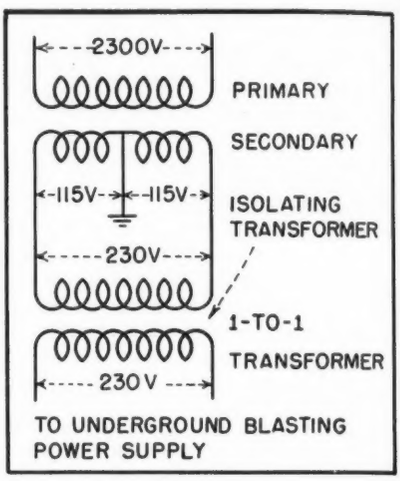
OPERATING IDEAS





A Fool-Proof Blasting Switch

The following features of this blasting switch illustrated and described by P. C. Ziemke, Oak Ridge, Tenn., guarantee safety in blasting from power lines:

1. A padlock prevents unauthorized persons from throwing the switch.

2. A baffle mounted on the door prevents the switch from being set in the "firing" position when the door is closed. The switch must be in the "down" position when the door is closed. This short circuits to ground any extraneous currents that might otherwise flow to the blasting lead wire with a potential sufficiently high to explode detonators prematurely.

3. Connection of the blasting lead cable to the switch blade is made through a 3-wire receptacle. As the power receptacle is a 2-wire type, workmen cannot accidentally connect the blasting lead directly to the power supply without benefit of protection offered by the switch.

4. The power supply is intentionally kept out of the switch except for the short interval during which the shot is fired to enable repairmen to replace fuses and lamps without danger of shock. Secondly, this system prevents sneak currents from flowing across the switch if moisture should collect inside the box. To energize the switch a short cable is carried by the blasting engineer which is used to link the power-supply receptacle with the lower receptacle.

After the switch has been energized and the lead wire plugged into the special receptacle, the shot is ready to fire. A lamp across the load side of the fuses confirms this condition. Fuses are designed to blow if a short circuit occurs in the lead wire or blasting network. The darkened lamp indicates this condition if it exists.

5. As it is nearly impossible to insulate a blasting network completely from earth, it is important to insure passage of sufficient power through the circuit to cause detonation. The conventional grounded-current circuit used for power and lighting is not recommended for blasting because of the tendency for grounded currents to leak off through defective wire insulation and connections. Consequently an "isolating" transformer (see diagram) which has the same number of turns on primary and secondary is used to convert 230-v. current from a grounded type to 230-v. isolated current. The secondary output is therefore free of earth connection and the tendency to break down insulation and cause misfires.

Memo from our RAW MATERIALS DEPT.

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION
OFFICE MEMORANDUM

DATE 8/11/48

TO Metallurgical Dep't.

SUBJECT: Performance of Heat Treated JALLOY Steel at Benson Mines, Star Lake, N. Y.

1" x 6" heat-treated JALLOY #3 flats to reinforce truck-body bottoms and doors. Service--severe impact loading of hard rock magnetite ore from 5-yd. shovel. Year round operations in temperatures to minus 47°F. Severe abrasion in unloading. Installations have been in service 13 months --305,000 tons handled per truck. Units equipped with these flats maintain bottom flatness and clean readily. Insignificant wear at this date indicates at least 2 years life before replacement is necessary.

WHAT better "laboratory" could we find to prove the qualities of J&L Steel than in the equipment required in our own operations?

The handling and moving of heavy, abrasive ore-bearing rock, at our Benson Mines, is a rugged test for any equipment. Yet our stone trucks equipped with heat-treated J&L JALLOY Steel reinforcing strips have run *more than a year* without bottom replacements. *And recent reports indicate at least two years life!*

These JALLOY strips receive the full impact of huge rocks *dropped* into the truck bodies, and withstand the abrasion caused by dumping load after load. This continuous resistance to shock is particularly noteworthy because of the embrittling effect of the sub-zero temperatures encountered during winter months.

J&L JALLOY is a fine-grain, heat-treated steel made in a wide range of physical properties with tensile strengths of 155,000 to 180,000 lbs. per sq. inch. Its inherent ability to withstand shock and abrasion adds life to equipment that must be tough and strong—such as: Rock crushers, Scrapers, Bulldozers, Dump cars, Power-shovel buckets, Truck bodies, Sandblasting equipment—or wherever abrasion and impact are limiting factors.

Manufacturers of trucks and trailers designed for heavy service will find JALLOY an excellent material for body bottoms, reinforcing strips exposed to severe abrasion, tail gates and many other applications. You'll find that JALLOY is a steel that stands up when the going gets tough. For more complete information, let us send you the booklet: "*Jalloy*—J&L *Alloy Steel.*" It includes data on properties, heat treatments and workability. The coupon at the right is for your convenience.

Jones & Laughlin Steel Corporation
412 Jones & Laughlin Building
Pittsburgh 19, Pennsylvania

Please send me your booklet: "Jalloy—J&L Alloy Steel."

Name_____ Title_____

Address_____

_____

JONES & LAUGHLIN STEEL CORPORATION

PERSONAL NEWS

Dr. A. B. Parsons, secretary of the American Institute of Mining and Metallurgical Engineers, has resigned after 18 years in the position. Until Feb., 1949, when his resignation becomes effective, he will be on leave of absence and will leave shortly to make his home at 6091 Castle Drive, Oakland, Calif. Prior to his position as secretary of the AIME and editor of *Mining and Metallurgy,* he served as associate editor of the *Mining & Scientific Press* which later merged with *Engineering & Mining Journal.* **E. H. Robie,** assistant to Dr. Parsons, will be acting secretary for the remainder of the year.

A. B. PARSONS

George W. Robinson, Toronto, Can., has taken over management of operations at Polaris-Taku mine at Tulsequah. He replaces **F. H. MacPherson.**

A. S. Dawson, former geologist for the Manitoba Department of Mines and Natural Resources, and assistant development commissioner in Montreal since 1945, has been appointed geologist for the Canadian Pacific Railway at Calgary.

Ray D. Satterley, general superintendent of iron mines for Inland Steel Co., was recently elected president of the Michigan Tech. Alumni Association. He succeeds **Milton P. Botsford,** of Duluth, district manager of Hercules Powder Co. **E. P. Scallon,** of Butler Brothers' St. Paul office, was named vice president.

Arthur Martini has been made mining captain of Pickands, Mather & Co.'s Zimmerman mine on the Menominee range.

Robert P. Bremner, formerly with Pickands, Mather & Co. on the Gogebic range, has been appointed mining engineer in charge of all mining problems of the Youngstown Sheet & Tube Co.

F. C. Green, general superintendent at the Chino Mines division of Kennecott Copper Corp., has been made assistant general manager; **Edward A. Schroer,** mill superintendent; and **Walter J. Akert,** assistant mill superintendent.

W. F. Dietrich, of Morse & Associates, Capitola, Calif., is in Juneau, Alaska, acting as consulting mining engineer for the U.S. Bureau of Mines. He is conducting studies relating to the utilization of Alaska's minerals as a basis for developing industries for the Territory.

Dr. Vernon E. Scheid, head of the geology-geography department at the University of Idaho, was recently elected to membership in the International Society of Economic Geologists, in recognition of his work on Pacific Northwest mineral deposits during World War II.

V. E. Christensen, chief testing engineer at the International Smelting & Refining Co. plant at Tooele, Utah, has been appointed land tax and claim agent at Tooele, succeeding the late **C. R. McBride.**

Wallace S. Arnold, Canon City, Colo., high school graduate, has been awarded the Charles A. Grimes memorial scholarship at the Colorado School of Mines.

Andrew W. Liddell, general manager of the Phelps Dodge Mercantile Co., has retired and will be succeeded by his assistant, **Sidney Strickland.**

C. C. Kamm, former chief engineer at East Malartic Mines, Ltd., Norrie, Que., has resigned to take a position with Kenneco Exploration Co., Ltd. **J. H. Evans** has been appointed to succeed him.

W. D. Tidrick, Los Angeles, was recently elected president of Olamont Mining Co., which operates the Jewell gold property in the southwest portion of Butte. The other officers elected were: **Elmer G. Malin,** Ogden, Utah, vice president; **Howard A. Johnson,** Butte, secretary-treasurer; **Alice S. Johnson,** Butte, **John Bork,** Butte, and **Lee Glen,** Ogden, directors.

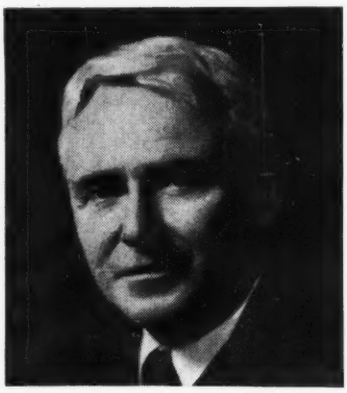
Frank Collins, Berkley, Calif., has been engaged as consulting engineer by Beavermouth Dredging Co., Ltd. to make an examination of the company's operation on the Cottonwood River, near Quesnel, B. C.

Charles Graham retired recently after 16 years service with the British Columbia Department of Mines.

K. J. Christie, formerly inspector of mines at Yellowknife, N.W.T., has been appointed chief inspector of services of the Dominion Department of Mines and Resources for Yukon and Northwest Territories with headquarters in Ottawa. **Steve Homulous** succeeds him at Yellowknife.

Eugene M. Thomas, dean of engineering, College of Mines and Metallurgy of the University of Texas, has been appointed president ad interim, to serve until a successor is chosen to **Dr. D. N. Wiggins,** president. Dr. Wiggins has resigned to become president of Texas Technological College at Lubbock.

Dr. Donald H. McLaughlin, president of Homestake Mining Co., has been elected a director of the International Nickel Company of Canada, Ltd. He succeeds the late **William N. Cromwell,** former member of the firm of Sullivan & Cromwell.



DONALD H. McLAUGHLIN

Reed W. Hyde, graduate of the School of Mines of Columbia University and since 1942 associated with the Irvington Smelting & Refining Works, has joined the Sintering Machinery Corp. as president. For several years he was employed by American Smelting & Refining Co.

Dr. Francis Cowles Frary, director of research, Aluminum Company of America, has been elected to receive the Gold Medal of the American Society for Metals for 1948. The medal will be presented during the National Metals Congress and Exposition in Philadelphia, October 25-29.

Dr. Carey B. Jackson, research chemist of the Mine Safety Appliances Co., has been awarded the U. S. Navy's public service award for his contribution to the development of Navy oxygen breathing apparatus and the engineering development of the commercial production of potassium, potassium-sodium alloys and their oxides in World War II.

Francis V. Sheppard has been elected vice president in charge of sales of the Woodward Iron Co., Woodward, Ala., to succeed **John B. De Wolf,** retired. **Mr. Sheppard** was formerly general sales manager of the Harbison-Walker Refractories Co. in Pittsburgh.

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The BIRD Centrifugal Classifier takes out slimes however fine.
It can do the job without chemical dispersion.
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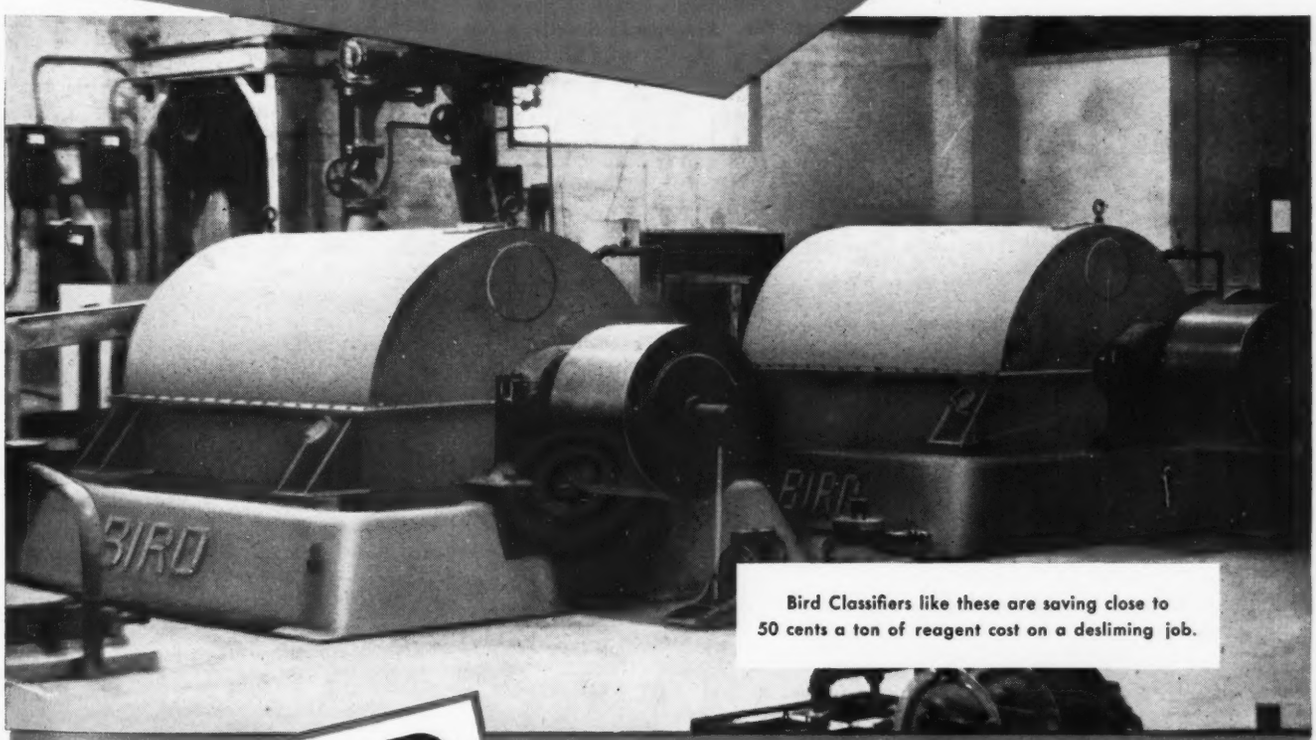


Bird Classifiers like these are saving close to 50 cents a ton of reagent cost on a desliming job.

The BIRD Centrifugal CLASSIFIER

L. M. Becker has been transferred by Pickands, Mather & Co. from the Scranton iron mine at Hibbing, Minn., where he was pit foreman, to the Cuyuna iron range as assistant superintendent.

W. M. Armstrong, associate professor of mining and metallurgy at the University of B. C., has been named convenor of the education committee of the B. C. chapter, American Society for Metals. Other convenors are: **P. Blan,** membership; **L. P. Carter,** entertainment; **W. J. Evans,** public relations; **Paul Hookings,** technical reports; **Oscar Olson,** attendance; and **F. Cazalet,** roster.

Christ Beaton has been appointed superintendent of hydraulic operations by Lincoln Gold Placers, Ltd. on Lost Creek in the Manson Creek area in British Columbia.

Francis Bochatey, Leadville, Colo., is the new chief clerk of the Resurrection Mining Co. at Leadville, succeeding H. W. Volkman, who has been transferred to New York as assistant chief of the Newmont purchasing department.

Samuel G. Lasky, geologist for the U. S. Geological Survey, has been transferred from Silver City, N. Mex. to Washington, D. C. where he will organize a new service being established by the Department of the Interior to conduct and maintain a continuous appraisal of the mineral resources of the United States.

A. F. Hoffman, Deadwood, S. D., who has long been active in work in the Black Hills National Forest, has retired as supervisor.

Edythe Thomson, well known in Kootenay boundary mining circles in British Columbia, has taken over the Manila field offices of Panaminas Mining Co. Miss Thomson became widely acquainted with Kootenay district mining as secretary of the Chamber of Mines of Eastern British Columbia at Nelson.

E. F. Goodner has been appointed executive vice president of the American Gilsonite Co., succeeding **C. F. Hansen,** who has been named president of Calmara Oil Company of New York. Mr. Goodner will make his headquarters at Salt Lake City.

Ray R. Femm, flotation mill metallurgical clerk at the Midvale, Utah plant of U. S. Smelting, Refining & Mining Co. has retired after 31 years' service with the company. **Donald L. Peterson** succeeds him.

R. Sholto Douglas has returned to this country from Korea, where he has been with the Bureau of Mining, USAMGIK for the past 15 months. Early in 1949 he will return to Korea as consulting engineer to Kim Do Hyun, in designing and constructing a cyanide custom mill in the Yulpo Gold area.

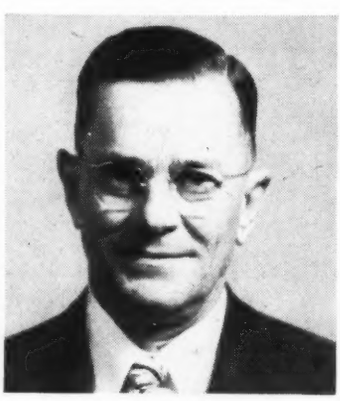
Walter M. Horne, Salt Lake City, has been appointed assistant manager of the Utah Mining Association.

Wallace D. Barlow, formerly with the U.S. Bureau of Mines, has joined the professional staff of the Interior and Insular Affairs Committee of the Senate. Before going with the Bureau of Mines, he was with Rhodesian Congo Border Concessions, Ltd., N'Changa, Northern Rhodesia.

WALLACE D. BARLOW

Nathaniel C. Fick, metallurgist with Battelle Memorial Institute for the past five years, was recently appointed deputy executive director of the Committee on Basic Physical Sciences, Research and Development Board, Washington, D. C.

Fremont E. Wood, chief engineer for Western Gypsum Co., Sigurd, Utah, has resigned to accept a position as mechanical-electrical superintendent for American Smelting & Refining Co. at Parral, Chihuahua, Mex. Prior to his association with Western Gypsum, he was chief engineer for California Institute of Technology at Inyokern, Calif.



FREMONT E. WOOD

L. J. Randall, Wallace, Idaho, has been named comptroller in charge of tax adjustments for the Hecla Mining Co. to succeed the late **Leo J. Hoban. L. S. Eddins** has been appointed office manager to succeed **Bert Woolridge,** retired.

Fred J. Hemsworth has been appointed resident mining engineer for the B. C. Department of Mines at Prince Rupert, succeeding **Dr. James Black,** who will be transferred to the Victoria office at the end of the present field season.

Bernard C. Jacobs, chief chemist for the Chino Mines Division of Kennecott Copper Corp., has been made metallurgical engineer.

J. D. MacKenzie, general manager of the western department of the American Smelting & Refining Co., has been transferred from the San Francisco office to the New York office of the company.

Leonard Greer has been appointed manager at New Rouyn Merger Mines, Ltd. He succeeds **R. V. Hopper,** who has been appointed manager at Consolidated Beattie Mines, Ltd., Duparquet, Que.

A. V. Corlett, manager of Normetal Mining Corp., Dupuy, Que., has resigned to become professor of mining engineering at Queen's University. **R. J. Allen** succeeds him.

R. S. Reynolds, Jr., vice president and treasurer of the Reynolds Metals Co., has been elected president to succeed his father, **R. S. Reynolds,** who continues as chairman of the board. **M. M. Caskie,** vice president and director, has been named executive vice president, **Kenneth Mann,** manufacturing vice president, and **Calvin Coghill,** treasurer.

William R. Webb, production superintendent of Jones & Laughlin's Blair quarries in West Virginia, has been appointed assistant general superintendent of J. & L.'s Benson iron mine, Star Lake, N. Y.

R. R. Rose, former managing director of the Cariboo Gold Quartz Mining Co. has been appointed president and managing director of McVicar Mines, Ltd.

Walter C. Lawson, general superintendent of the Morenci branch, Phelps Dodge Corp. became general superintendent of the New Cornelia branch Sept. 1, according to an announcement from **H. M. Lavender,** vice president and general manager of the corporation. **W. E. Fenzi,** former assistant superintendent of the Morenci branch, succeeds Mr. Lawson.

Howard J. Vander Veer, geologist, has been appointed special consultant on mineral matters to the Bureau of Land Management, Salt Lake City. He will serve as a bureau liaison representative with mining, oil and gas associations and with private companies prospecting in the Colorado-Utah area.

Seton S. Williams, assistant to **Theodore Dodge,** consulting mining geologist, has opened an office in Tucson, Ariz.

Russell P. Jose has been appointed superintendent of the Ironton mine at Bessemer, Mich., according to an announcement by **W. A. Knoll,** general superintendent for Pickands, Ma-

ther & Company on the Gogebic range.

Carleton S. Harloff, former works manager of the Laurel Hill copper refinery of Phelps Dodge Refining Corp., has been appointed vice president of the company.

James H. Taylor has been made mine superintendent at the Hochschild property, Compañia Huanchaca de Bolivia, Pulacayo, Bolivia. He was formerly general mine foreman for the South American Development Co. at Portovelo, Ecuador.

Earl S. Mollard and **H. E. Reese,** respectively manager of mines and superintendent of Hibbing District mines for Butler Brothers, Cooley, Minn., were presented in the August *E&MJ* as authors of the article describing the stripping scheme at the South Agnew open-pit mine on the Mesabi. The article specified that the big 25-cu. yd. walking dragline described was a Model 1150-B. It should have added that this model is one of the Bucyrus-Erie Co.'s line.

Harvey J. Hakala, mining engineer, is now with Cia. Meridional de Mineracao, Caxixa Postal 2875, Rio de Janeiro, Brazil. The firm is a subsidiary of the Oliver Iron MiningCo.

James W. Clemens has been made safety engineer for M. A. Hanna Co. in the Iron River district, Michigan. He was formerly with the U.S. Smelting, Refining & Mining Co. in Utah.

L. P. Barrett, vice president of Jones & Laughlin Ore Co., has returned to Pittsburgh after a trip to inspect drilling being done on the Michipicoten range, Ontario, and the Marquette range, Michigan.

OBITUARIES

Martin LeBow, Empire, Colo., mining man, died recently in Denver. He at one time was owner of a considerable portion of the mining claims that comprised the holdings of the Minnesota Mining Co.

Danile P. Bagnell, Spokane, Wash., mining broker, died Aug. 2. He was 84.

Roy Ashley Clark, mining engineer, Seattle, died July 30 after a long illness. Widely known in Pacific northwest mining circles, he had served as an engineering consultant for various mining companies since 1933.

John Tomlinson Lloyd, 82, part owner in several mines in Utah, Nevada and Montana, died Aug. 1 in Salt Lake City.

Percival P. Butler, 71, metallurgical mining engineering for Phelps Dodge Co., died Sept. 2 at his home in El Paso, Tex. He was formerly superintendent with the Copper Queen

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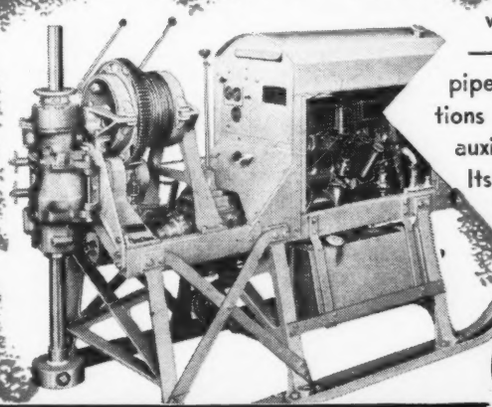
Out of Canada comes the . . .
WORLD'S MOST ADAPTABLE SURFACE DIAMOND DRILL - BBS-2



Model BBS-2 drills a wide range of diameters — handles rods, casings, pipes in various combinations — can be equipped with auxiliary hoist for bailing. Its capacity: 2000 feet with "E" rods — 1800 feet with "A" rods.

BOYLES BROS. DRILLING CO. LTD.
DIAMOND DRILLING CONTRACTORS AND MANUFACTURERS

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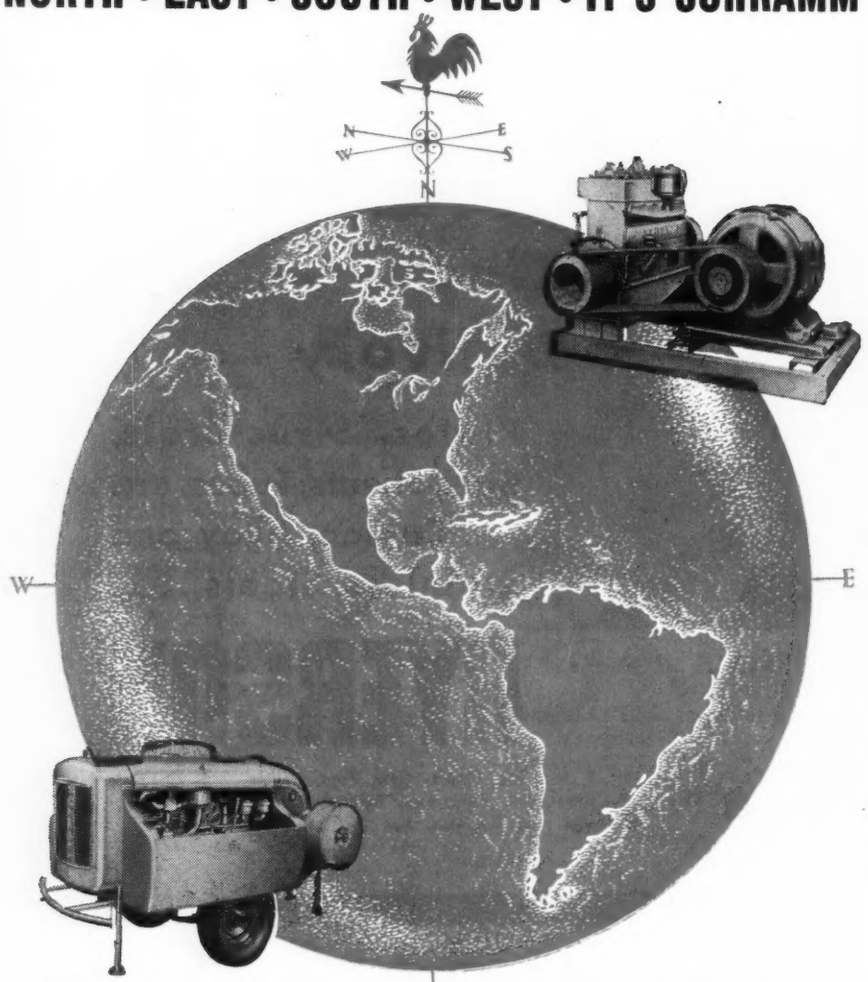

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compact . . . no waste space, compressor and engine coupled into a single, rigid, permanently aligned unit . . . balanced to reduce wear and increase efficiency!

lightweight . . . Portables designed for quick handling to and from the job, stationary units vibrationless.

easy to start . . . Just push the built-in electric starter, and the Compressor starts . . . to give you a continuous amount of air.

TOOLS FOR THE JOB

Schramm Inc. also has a complete line of Pneumatic Tools to offer and recommend for operation by their Compressors.

These include Rock Drills, Paving Breakers, Trench Diggers, Clay Spades, Backfill Tampers, Tie Tampers, Sheeting Drivers, Demolition Tools, Chain and Circular Saws.

Write for bulletins and prices.

. . . For these reasons users of Schramm Air Compressors have said they *like* to operate both stationary and portable Schramm units.

Other features, however, enter into the usefulness of Schramm. There's 100% water cooled feature, allowing you to operate Schramm perfectly both summer and winter; mechanical intake valve, forced feed lubrication, to mention a few.

Schramm features make them the Air Compressors ideal for your many jobs . . . and the reasons they're specified North, East, South and West. Write today for data.

SCHRAMM INC.

THE COMPRESSOR PEOPLE, WEST CHESTER, PENNSYLVANIA

smelter at Douglas, Arizona.

James Robert Moore, 59, Birmingham, Ala., died Aug. 31. Until his retirement two years ago, he was superintendent of the Republic Steel Corp.'s Spaulding ore mine.

Frank H. Cothran, former mining engineer at Toms Creek, Va., died Sept. 1 at Charlotte, N. C. He was 70.

Edgar L. Rossin, 47, died of a heart attack on Aug. 18, while on a fishing trip near Santa Fe, New Mex. He was vice president of Miami Copper Co. and director of the Tennessee Corp. and South American Gold & Platinum Co. Mr. Rossin, mining engineer, was a member of the AIME.

James R. Shreve, office manager for the Sunshine Mining Co., was killed in an automobile accident between Big Creek and Kellogg early in August.

Paul J. Sirkegian, 52, Kimberly, Nev., died Aug. 24. He had been general superintendent of Consolidated Copper Mines Corp. since 1926.

LETTERS

A Proposed Venture-Capital Incentive

The Editor:

Your July number presents an editorial on "Proposed Venture-Capital Incentives," and a contribution by Mr. Baragwanath entitled "New Mining Investment is Vital." Both of these are timely and deserving of nationwide attention. Especially noteworthy is the editorial's admonishment for the "necessity of broad understanding, unanimity of purpose and strong grass-roots support for corrective measures." I heartily endorse the Editor's appeal for wider recognition of the mining industry's need for tax relief, as an incentive for the revival of "venture money" appropriation.

Mr. Baragwanath's reference to the S.E.C.'s restrictions on mining company shares, as compared with our legalized, wide-open race-track betting, should make the law-makers sit up and think.

Let me suggest that reprints of these two articles be sent to our lawmakers, the members of our Chambers of Commerce and our Manufacturer's Associations. The AIME could well join with *E&MJ* in a publicity campaign, starting by arousing the industry itself, and then reaching into all sections of the public.

Both the Editor and Mr. Baragwanath advocate exemption from taxation, for a few years, of new mining ventures as an appropriate incentive. Why not concentrate on that feature as the immediate object of the campaign? R. M. ATWATER, JR.
Chadd's Ford, Pa.

NEW BOOKS

MINING GEOLOGY. By Hugh E. McKinstry, professor of geology, Harvard University, with sections by Stanley A. Tyler, professor of geology, University of Wisconsin; E. N. Pennebaker, consulting geologist, Consolidated Coppermines Corp.; and Kenyon E. Richard, geologist, American Smelting & Refining Co. Published by Prentice-Hall, Inc., New York, N. Y. Pp. 680. Price, $10.

In the "Foreword" of this text the author outlines his purpose—to survey "that incompletely charted borderline that lies between respective domains of geology and mining." More simply stated, a mining man might expect to learn "How to Use Geology to Find Ore."

This is exactly what the author delivers in the second part of his text entitled "Geological Principles of Ore-Search and Ore Appraisal" which is covered in some 360 pages containing chapter headings like these: "The Use of Fact and Theory," "Guides to Ore-Targets and Loci," "Physiographic Guides," "Mineralogical Guides," "Stratigraphic and Lithologic Guides," "Fracture Patterns as Guides," "Contacts and Folds as Guides" and others.

In addition to these interesting and practical discussions, the first third of the book is devoted to "Assembling Geological Data," and the last third to "Application in Specific Phases of Mining," including field exploration, examining and developing prospects, valuing mining properties, and engineering geology in mining.

The author has drawn heavily on his own wide experience and that of other successful geologists to prepare a book that is destined to be well thumbed in the personal libraries of many geologists and mining engineers.

SILICOSIS, PNEUMOKONIOSIS AND DUST SUPPRESSION IN MINES. Proceedings of joint conference held in London, April, 1947, by Institution of Mining Engineers and Institution of Mining and Metallurgy. Published by the two Institutions at Salisbury House, Finsbury Circus, London, E.C.2, Eng. Pp. 190, plus 43 plates. Price £1 (members, 20s.).

Three of the 17 papers presented at the Conference cover aspects of the pathology of dust disease. A fourth paper deals with the pneumokoniosis of coal workers in South Wales. This, it is claimed, resembles in general the "classical" disease of Rand gold mines. However, the lung changes show distinct differences in detail. Paper 5 considers pneumokoniosis in the Kolar gold field, in South India, where the existence of silicosis as known on the Rand has often been denied, despite the fact that quartz is worked. A form of pneumokoniosis is now acknowledged as common, after clinical and radiological examination of 7,563 workmen with five or more years of underground experience. In this group the incidence was 43.75%. The disease here is declared to be distinctly different from classical silicosis, radiologically and pathologically. It resembles the latter only in the increased susceptibility to tuberculosis in both conditions. The assumption is that a dust other than quartz is the cause or else that the action of quartz is highly modified by another dust. Composition of the dust inhaled is not as yet fully known.

Paper 6 covers silicosis control in the hematite mines of northwestern England. Here, mines in one location produce pulmonary fibrosis, while those in another do not. In the former, introduction of a mist projector in 1935 reduced dustiness from a very bad condition to an average of 2,500 particles per c.c., or approximately 250 particles of silica per c.c. The mist projector is said to be useless if not used efficiently.

Among the remaining papers one consists of notes on silicosis at Broken Hill, Australia. There no man who entered the industry since 1922 and had previously done no mining elsewhere has been found to be suffering from silicosis. Reasons cited are: The large quantities of air used for ventilation; the requirement of medical examination before employment; and the practice of blasting only at the shift end, with an hour interval between shifts. Another paper, on aluminum therapy, by a contributor in Britain, favors the procedure suggested by McIntyre Research, Ltd. The remaining papers of the group of 17 deal chiefly with dust sampling, examination and suppression.

The view appeared to prevail at the Conference that the subject is exceedingly complex; that in teamwork lies the only hope of solution.

RADIOACTIVITY SURVEYS IN THE KANSAS PART OF THE TRI-STATE ZINC AND LEAD MINING DISTRICT. By Robert M. Dreyer. Published as Bulletin 76, part 5, by the State Geological Survey of Kansas, University of Kansas, Lawrence, Kan.

Although the results of the survey described in this report were negative, the technique is interesting in its testing of the Geiger counter as an aid in finding orebodies and outlining geological structures. Unfortunately, as the abstract of the report states, the indication is that "the Geiger counter is of no value either in locating orebodies or in delineating major structural features in the Tri-State district."

CANADIAN MINES HANDBOOK. Published by Northern Miner Press, Ltd., 122 Richmond St. West, Toronto 1, Canada. Pp. 336. Price, $2.00.

Exploration for new gold properties and mine incorporations, in Canada have fallen off this past year rather markedly, according to the authoritative handbook of Canadian mining compiled each year by the publishers of the *Northern Miner*, Canadian mining newspaper. Listing active, inactive, exploring and producing mines, the publication finds that the number of companies engaged in looking for gold has dropped off from 1,369 two years age to 360 this year. Most of this decline has occurred since the Canadian price of gold was cut in July, 1946. The number of companies looking for metals other than gold has crept up in two years from 205 to 256. During the past year, 143 new mining companies were incorporated, as compared with 531 the previous year, and 930 in the year before the gold price was cut.

On the credit side, however, is the fact that the number of producing mines has increased from 100 two years ago to 150 now. The editors of the Handbook also predict that Canada's base metal output for 1948 will set a new record for value. They expect the value of base metals mined this year to reach $350 million, against $275 million in 1947.

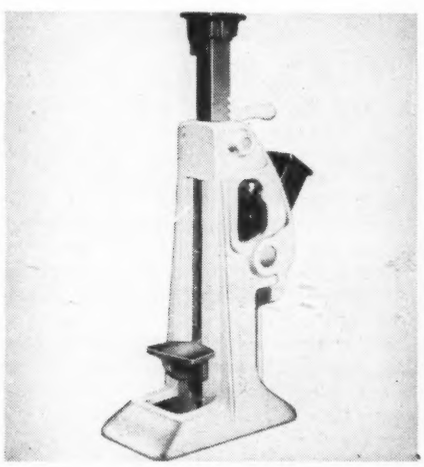
FORMING OF AUSTENITIC CHROMIUM-NICKEL STAINLESS STEEL. Assembled and edited by Vsevolod N. Krivobak, International Nickel Co., Inc., and George Sachs, Case Institute of Technology. Published by The International Nickel Co., Inc., New York, Pp. 309. Price $4.

This book was compiled to give fabricators of metal equipment a better understanding of the adaptability of stainless steels to all modern processes of forming. Modern forming procedures as applied to chromium-nickel stainless steels and practiced in fabrication plants in the United States are presented. Specific examples of forming technique are supplemented by details of tool design, lubricants, data on dimensions, and consecutive steps in fabrication.

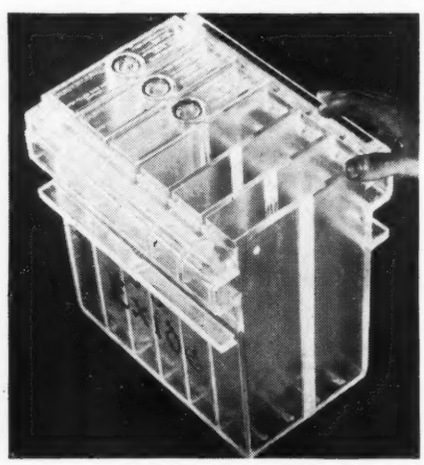
EQUIPMENT NEWS

NEW PORTABLE gasoline-powered air compressor, built by Ingersoll-Rand Co., Phillipsburg, N. J., is designed to operate small pneumatic tools for construction and repair jobs. For full details write to the company for illustrated Form 145.

MATERIAL HAULING UNIT, announced by R. G. LeTourneau, Inc., Longview, Tex., is constructed to carry long and heavy loads over soft, difficult terrain and to travel on highways and off the road. The unit is called the TH-4 Tournahauler.

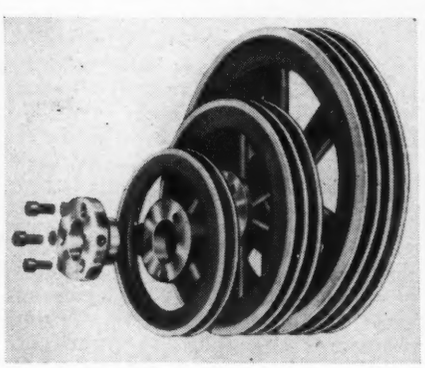


ALUMINUM ALLOY TRACK JACK weighs 41.5 lb., can lift 15 tons. Minimum height of toe lift is 2½ in. Total lift is 13 in. The jack is made by Templeton, Kenly & Co., 1020 S. Central Ave., Chicago 44, Ill.

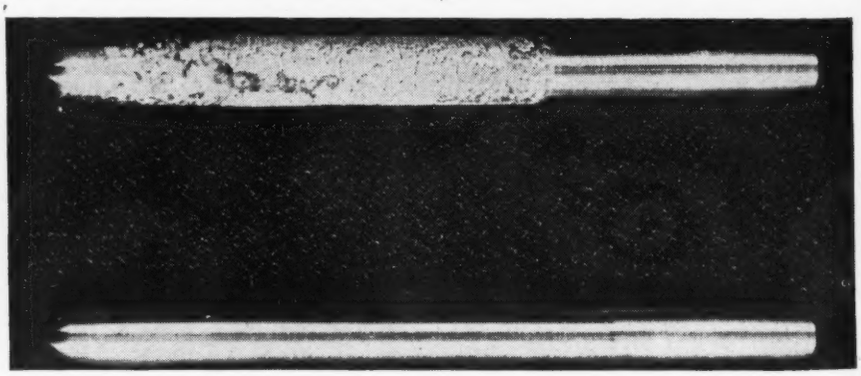


PLASTIC BATTERY CASE, made by Electric Storage Battery Co., Philadelphia, enables Exide battery to yield more starting power with less space and weight than other types of non-spill, lead-acid batteries.

FOLDING POCKET STEREOSCOPE to enable geologists and engineers to interpret aerial photographs is offered by Fairchild Camera and Instrument Co., 88-06 Van Wyck Blvd., Jamaica, N. Y. Price $9.75.



VARIOUS DIAMETER RIMS can be mounted on the Transco interchangeable hub for V-drive equipment. This new product is announced by Transmission Machinery Corp., P.O. Box 7823, Dallas, Tex.

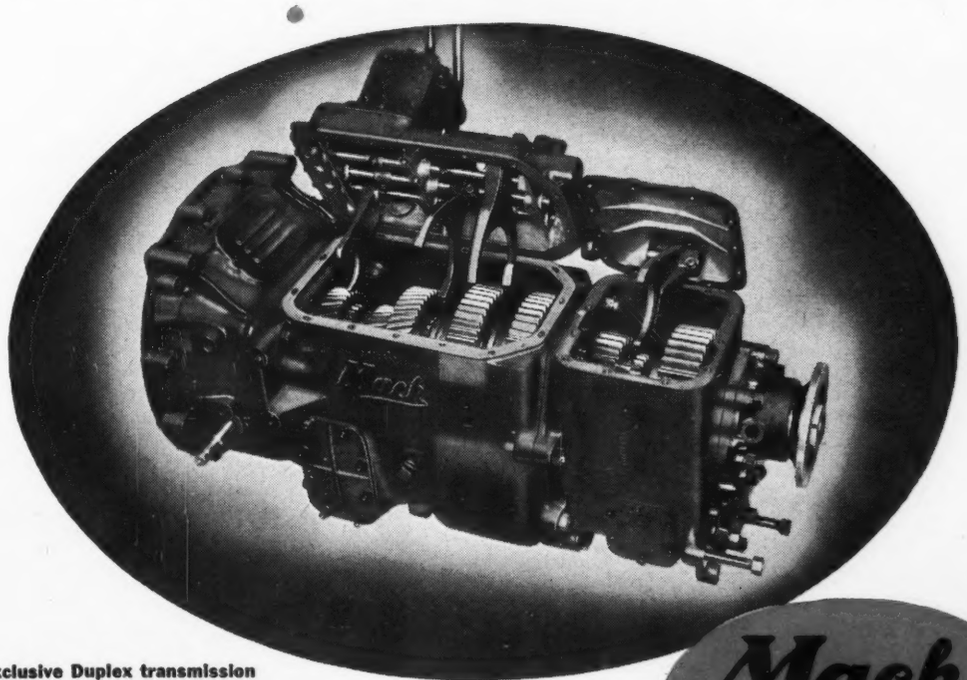


CLOGGED FUEL LINES PREVENTED. A newly discovered fluid, RD-119, is now being added to all petroleum products of the Sinclair Refining Co. The additive prevents the formation of scale and rust in gasoline and diesel engines, and in oil burners. Steel bar above shows rust which formed when bar was immersed in kerosene. Lower bar was immersed in kerosene containing RD-119 and came out rust free.

you get more work out of Mack Trucks

Mack Model LR is engineered for easy handling; built tough and strong to keep the ore moving away from the shovel—fast. This one serves the Inter-State Iron Co. of Virginia, Minn., subsidiary of Jones & Laughlin Steel Corporation, at the company's Longyear Mine.

because . . . we put more work into Macks



Mack's exclusive Duplex transmission is another example of the way Mack's better design pays off in better performance — on the job. Engineered as a single unit, the Mack Duplex gives eight forward speeds with easy even intervals between speeds. Closer steps result in higher average speed, easier shifting, better acceleration, improved fuel economy and less maintenance.

Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts. In Canada, Mack Trucks of Canada, Ltd.

SINCE 1900, AMERICA'S HARDEST-WORKING TRUCK

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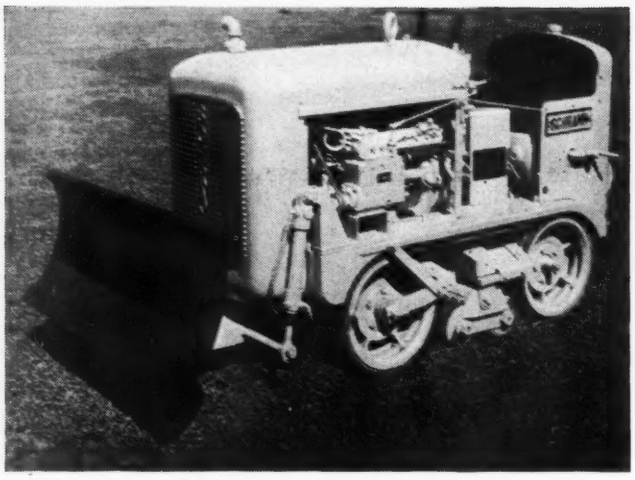
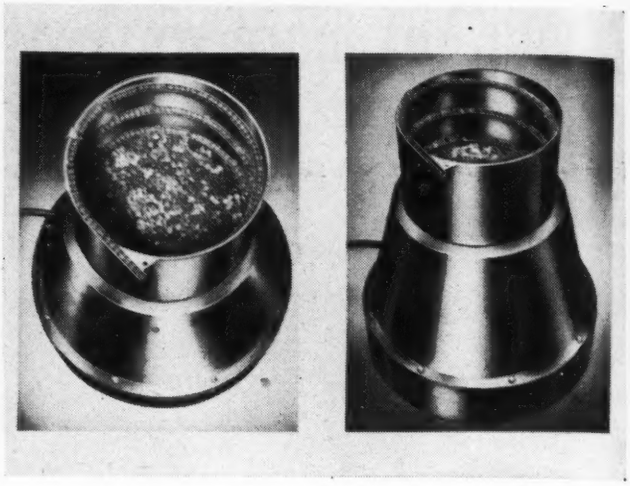
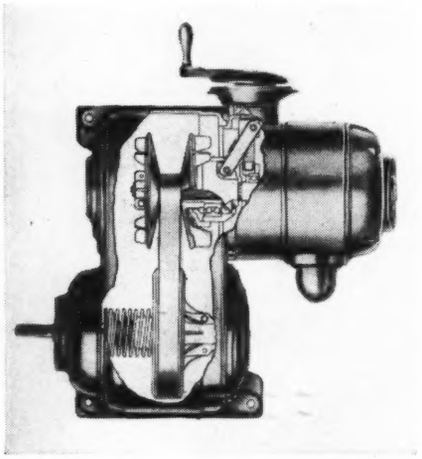


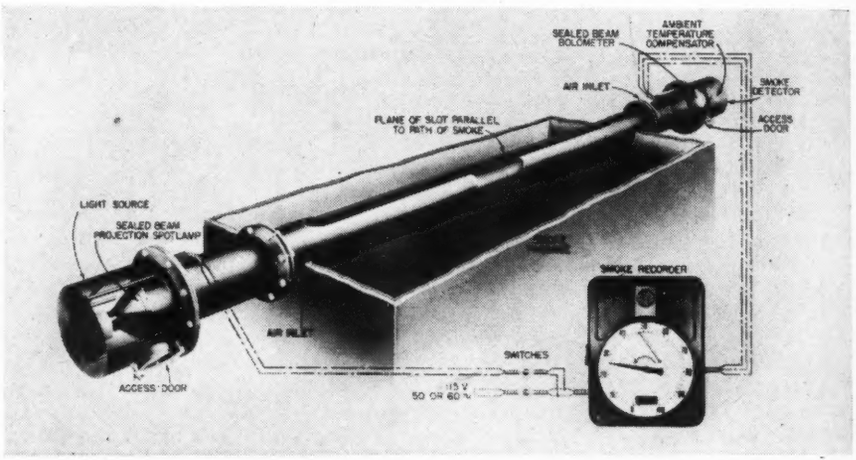
CRAWLER-TYPE COMPRESSOR, made by Schramm, Inc., West Chester, Pa., is shown here fitted with a hydraulic backfill blade. The blade may be used for light grading, traveling 14 in. above the ground to a position 11 in. below ground level.



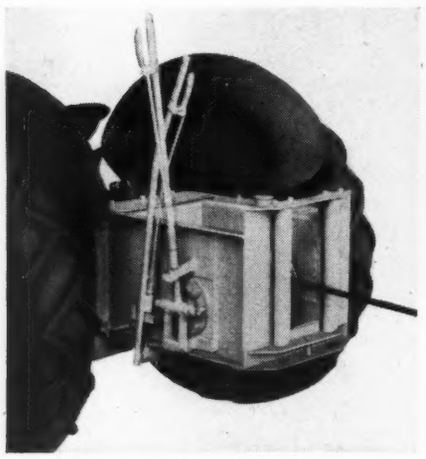
VIBRATORY VERTICAL BOWL developed by Syntron Co., 510 Lexington Ave., Homer City, Pa., is designed to feed powdered materials and small objects down to extremely small quantities and stream size. Action is produced by electro-magnetic vibration.



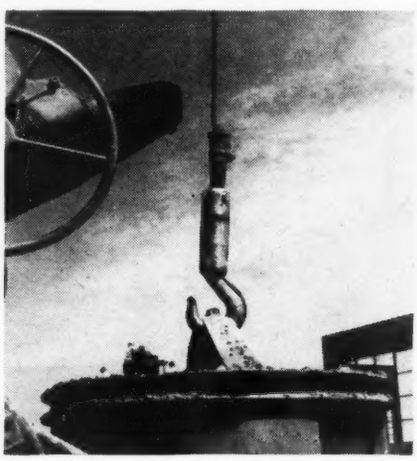
IMPROVED VARIABLE - SPEED MOTORS are illustrated in a 16-page bulletin showing important details of the U. S. Varidrive introduced by U. S. Electrical Motors, Inc., 200 E. Slauson Ave., Los Angeles 54, Calif.



A NEW ELECTRONICALLY-OPERATED SMOKE DENSITY RECORDER has been developed by the Bailey Meter Co., Cleveland, Ohio, which accurately measures and records the density of smoke and dust in flues or ducts. A sealed-in light source directs a beam across the path of the smoke. Radiation received by a filament on the opposite side of the unit varies with the amount of smoke passing. The values are recorded electronically.

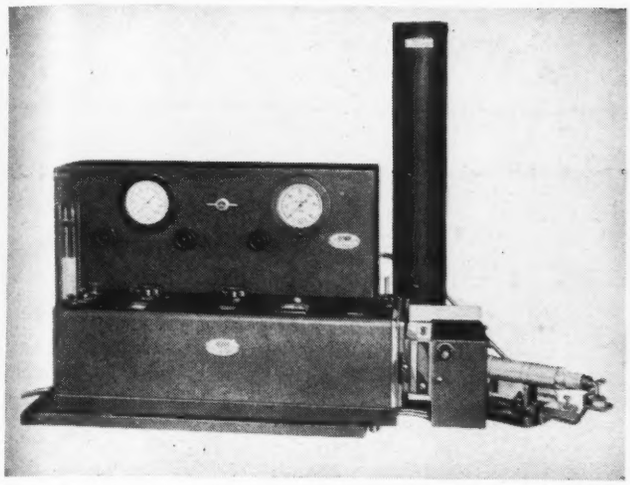


TRACTOR-WINCH with capacity of 7,500-lb. single-line pull is made by American Hoist & Derrick Co., St. Paul 1, Minn. Drawbar built into frame allows tractor to perform towing jobs without removing winch.

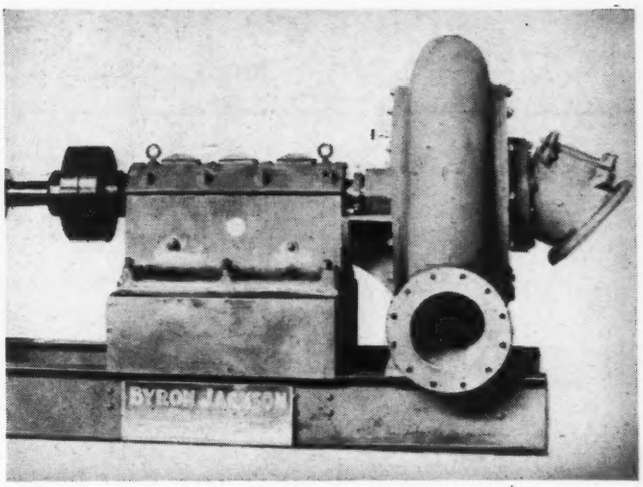


TWIST IN WIRE ROPE is eliminated with the new Miller ball-bearing swivel developed by General Machine & Welding Works, Pomona, Calif. Model shown here will twist under a 77,000-lb. load.

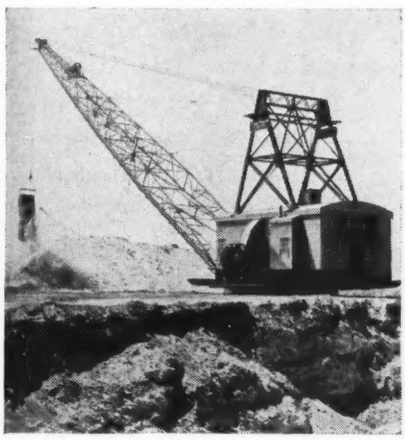
NEW PRINTING MACHINE produces "Ozaprints" at speed up to 25 ft. per min. and handles sheets up to 42 in. wide. Super B model is made by Ozalid Division, General Analine and Film Corp., Johnson City, N. Y.



NEW FLAME SPECTROMETER simplifies qualitative and quantitative analysis of a large number of chemical elements. The unit is designed by Beckman Instruments, South Pasadena, Calif., to cover wide spectral range from ultraviolet to near infrared regions.



HEAVY-DUTY SAND, GRAVEL AND ROCK PUMPS manufactured by Byron Jackson Co., Los Angeles, are now available in 8 standard sizes up to 12 in. Internal bearings are omitted on hydraulic pump parts. Working parts are easily accessible for inspection.



Walking Dragline

A new model in its line of walking draglines has been announced by Bucyrus-Erie Co., South Milwaukee, Wis. Called the 450-W, the new machine swings 8 or 10 cu. yd. buckets from a boom 200 or 165 ft. long. With the 8-yd. bucket and the 200-ft. boom, it can move material 407 ft. without throwing the bucket.

Hoisting and lowering are controlled through air-operated clutches and brakes. Swing machinery is under Ward-Leonard control. Weights are balanced so that the center of gravity shifts through a limited range, which keeps base rim pressures low. Alignment of machinery is rigid and accurate, and all parts are said to be easy to get at for servicing. Power is supplied by a heavy-duty diesel engine.

INDUSTRIAL NOTES

R. K. Gottshall has been appointed assistant general manager of the Explosives Department of **Atlas Powder Co.** **W. E. Collins, Jr.**, former manager of the Seattle sales district succeeds Mr. Gottshall as director of sales. **Geo. W. Thompson**, New York sales district, has been transferred to Seattle to succeed Mr. Collins.

Lloyd R. Leaver, president of John Stokes Co., Ltd., Welland, Ontario, has been elected a vice-president of the **Thermoid Co.**, Trenton, N. J., where he will manage Thermoid's Industrial Products Division.

Robert J. Russell has been elected secretary of **Hardinge Co., Inc.**, York, Pa. He will serve as chief of the technical staff of the Hardinge organization.

M. G. Garber has been appointed general sales manager, of the **Thew Shovel Co.**, Lorain, O., to succeed **Don G. Savage**, who died on July 25.

Lawrence W. Early, formerly resident manager of the Los Angeles office of **Hercules Power Co.**, has been transferred to the company's Salt Lake City office. **Robert W. Crabtree** will succeed Mr. Early.

G. Donald Emigh has been appointed manager of the Eastern District of **Western-Knapp Engineering Co.**, with headquarters at 50 Church St., New York 7, N. Y.

The following appointments have been announced recently by **J. W. Kinnear, Jr.**, executive vice president **Firth Sterling Steel & Carbide Corp.**; **W. J. Loach** as manager carbide development and quality control; **Chas. W. Iams, Jr.**, manager carbide production and fabrication at the McKeesport plant; **E. G. Moffatt** works manager at the Milford plant; and **A. B. Vestol** superintendent of plant engineering at McKeesport.

Stanley M. Moos has resigned as president and general manager of Western Machinery Co., S.A. of Mexico, D.F. and has opened up an office in his own name at 100 Texas St., Box 321, El Paso, Tex. where he will continue to sell mining machinery to operators in Mexico and Central America.

BULLETINS

Motor Starters. Ohio Brass Co., Mansfield, Ohio, describes and illustrates the Type BDG, skid-mounted, motor starter for 5 to 25 hp. motors at 250 and 550 v., d.c., in bulletin 834M.

Spiral Rake Thickeners. Denver Equipment Co., Box 5268, Denver 17, Colo., describes and illustrates the Denver Spiral Rake Thickener in Bulletin T5B4.

Drive Chains. Catalog 808, published by Jeffrey Manufacturing Co., Columbus 16, Ohio, contains 60 pages of pertinent information and engineering data on steel thimble roller drive chains. Illustrations adhere to the exact pitch of the chain in every case.

Portable Air Tools. Independent Pneumatic Tool Co., Aurora, Ill., announces Catalog MC-1, which lists a complete line of portable air tools for mining and construction.

Diesel Information. Cummins Engine Co., Inc., Columbus, Ind., announces the following bulletins: No. 5275, "The Exclusive Cummins Fuel System"; No. 5276, "On-the-job Performance"; No. 6202-3, "Dependable Service for Dependable Diesels."

Vibratory Equipment. Syntron Co., Homer City, Pa., has released catalog No. 486 which describes the entire line of Syntron power tools including electric hammers, concrete vibrators, portable electric drills, etc.

Quick Floor Repair. Stonhard Co., 401 N. Broad St., Philadelphia 8, Pa., has released a pamphlet entitled "One-Two-Three" showing how readily ruts and holes in floors can be repaired with "Stonhard Stonfast."

Rock-Drilling Film. Gardner-Denver Co., Quincy, Ill., has completed a new 16-mm. educational film "Man Against Rock" for schools, engineering societies and other organizations. Drilling, mucking, car transfer and steel sharpening are shown in this film which includes sequences taken in dam, highway and tunnel construction jobs.

New Flotation Machine. Complete design features operating advantages, and installation data are included in a folder describing a new flotation machine manufactured by Booth Engineers, Salt Lake City 1, Utah.

Transportation Map. Wolverine Tube Division, Calumet and Hecla Consolidated Copper Co., Inc., 411 Central Ave., Detroit 9, Mich., offers a free transportation map of the United States showing highways, railroads, airlines, and principal towns and cities.

REGIONAL NEWS

Photo by Claude Ferguson

AIRVIEW OF GRASS VALLEY, Calif., in the heart of the historic Mother Lode Country, and one of the points of interest visited by mining men attending the American Mining Congress convention in September.

CALIFORNIA

Yuba Consolidated company announces long-term project—Diamond drilling under way at Darwin Lead company

★El Dorado-Placer Mining Corp., M. G. Henness, president, is expected to start dredging operations shortly at Long Bar on the North Fork of the American River, about 8½ miles north of Folsom. A dragline dredge brought from Siskiyou County is being assembled for dredging the gravel deposit averaging 10 ft. deep. Capacity of about 50,000 cu.yd. per month is anticipated, and a crew of 13 men will be employed when operations get underway.

★Yuba Consolidated Gold Fields, Ltd. has announced a new dredging project expected to take about 25 years and involving redredging of the lower reaches of the Yuba River. It will be the third time the channel area has been dredged for gold. During mining, a new channel will be cut for the Yuba River from Daguerre Point to location near Parks Bar bridge. The channel will be 600 ft. wide, and dredging will be carried to a depth of 124 ft.

Recent tests and surveys indicate that the channel work ultimately will extend to the reworking of the 5,000 acres of gold-bearing gravels near Hammonton, Yuba County, and perhaps another 1,500 ft. south of the present field. In addition to gold recovery, the dredging operations are expected to benefit irrigators of Yuba County farm lands through elimination of seepage from the river. F. C. van Deinse is vice president and general manager, and H. C. Perring, general superintendent, is in charge of the company's Hammonton operations.

★All patented and unpatented lands of the Walker mine in Plumas County, at one time California's leading copper producer, have been sold to Coleman Burke, New York attorney, for $57,140.75.

★Mining operations have been started at the property of Darwin Lead Consolidated Mining Co. at Darwin, Inyo County. The property adjoins the Darwin Mines holdings of Anaconda Copper Mining Co., largest lead-silver producer in California. Work is centered in diamond drilling to determine depth of vein, and plans include sinking a shaft. Frank Burnham and Louis Cirac, Nevada mine operators, are major stockholders in the company. Harvey Dickerson, Las Vegas, Nevada, attorney, is agent for the company.

★Gold Ridge Mining Co. is driving a tunnel at the French mine three miles northeast of Bear Valley, Mariposa County. The property is operated under lease from Pacific Mining Co., P. R. Bradley, Jr., president. Harold Hansen is in charge of operations.

★A diamond drill campaign has begun at the old Goleta mine in Mono County by Bralorne Mines, Ltd., which recently acquired the property under purchase option. P. G. Dobson, manager of Summit King Mines, Ltd., a subsidiary of Bralorne Mines, is in charge of the work, and Ira B. Joralemon, a director of Bralorne, is consulting engineer.

UTAH

Tax commission sets value of ore for Columbia Iron—New Park company locates first bedded ore

★Mining companies must deduct federal income and excess profits taxes before computing depreciation allowances against state corporation tax levies, the Utah State Supreme Court ruled Aug. 11.

Deficiency assessments against all Utah mining companies as a result of this ruling are expected to amount to approximately a million dollars. An earlier decision to this effect by the State Tax Commission was challenged by New Park Mining Co., Tintic Standard Mining Co. and Utah Fuel Co., who asked the high court for a review.

★A net proceeds tax assessment against Columbia Iron Mining Co. based upon what the Utah State Tax Commission "felt truly represented the actual value of ore mined" rather than the price paid for the ore by Geneva Steel Co. under contract has been sustained by the tax commission.

Under a contract with Geneva, the mining company received cost plus 10c. per ton and reported gross proceeds of $1,325,917. The commission set the "actual value of ore mined" at $1.55 per ton and placed the company's gross income at $2,893,312. This increased the company's mine occupation tax from $12,759 to $28,433 and raised its net proceeds valuation (against which property taxes are levied) from $604,203 to $1,649,133.

The commission based its assessment against Columbia on the $1.55 per ton price of ore paid by Kaiser to Excelsior mine. "The iron ore produced by the Columbia Iron Mining Co. is not sold on the open market, but is used by the Geneva Steel Co., both [companies being] wholly owned subsidiaries of the U. S. Steel Corp.," the commission held.

★The 300-member Lark local union,

one of the original locals of district union No. 2, voted Aug. 27 to affiliate with Progressive Metalworkers' Council. The local previously had left MMSW and been connected with an independent group. The action followed circulation of a petition showing an overwhelming majority in favor of joining P.M.C. according to C. M. Reynolds, Lark president.

George J. Wilde, P.M.C. representative, said his union now represents 3,000 former MMSW members in the Utah-Nevada district and has 12 locals in the two states.

★Iron ore mined in Utah was 301,626 gross tons in June compared with 217,834 in May.

★The first bedded ore known to be on New Park Mining Co. property has been uncovered, W. H. H. Cranmer, president, has announced. The new ore, containing only lead and zinc, assayed about $42 per ton. Yield of current output from fissured bodies is about $26 per ton. Limestone was struck and the bedded ore located when a raise was put up from the main works at the 1,020-ft. level.

ARIZONA

Phelps Dodge purchases plants at Morenci and El Paso—Bureau gives 1947 production picture for state

★The Copper Queen branch of the Phelps Dodge Corp. has started a small open-pit operation near the old Wade Hampton shaft adjacent to Don Luis. It is expected to provide 5,000 to 6,000 tons of siliceous flux per month for the Douglas smelter. J. B. Pullen, superintendent of the Copper Queen branch and the smelter, said the operation will be intermittent, with a 2½-yd. shovel being used 8 to 10 days each month. No stripping will be involved, the operation to be carried on in low-grade quartzite.

★The Christmas copper deposit in Gila County shows a 2.48% deposit some 480 ft. below present diggings, according to the Bureau of Mines. The drill hole also showed a drift of approximately 130 ft. containing 2.37% ore and located about 800 ft. below the working level.

★The Bureau also reports that on ore samples from the Burmeister mine, Yavapai County; Spring manganese mine, Yuma County; Black Vulture mine, Maricopa County, and Black Warrior mine, Mohave County, metallurgists have recovered 64.9 to 96.8% of the manganese from low grade ores. All of the samples were held to be too low in grade for industrial use for ferro-manganese manufacturers.

★The Phelps Dodge Corp. has asked the Arizona State Board of Equalization to adjust the taxable assessments

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(With the continuously Moving Breaker Plate*)

- **ALL STEEL CONSTRUCTION**—for greater strength . . . longer life
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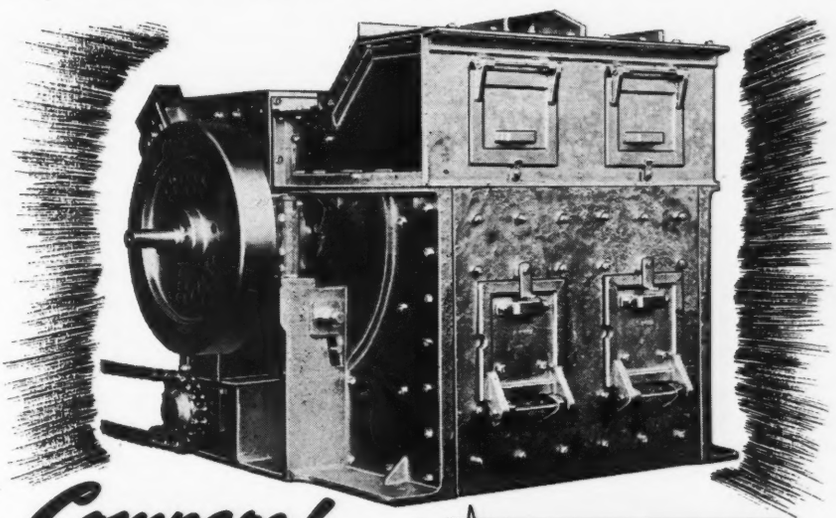

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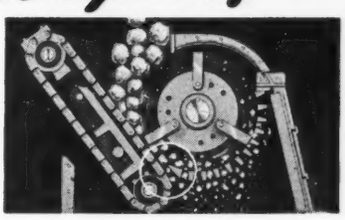

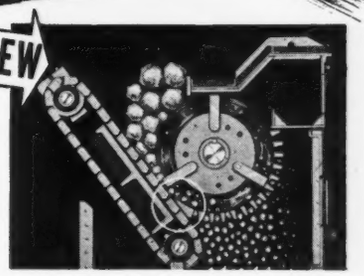

Note by comparing *before and after* diagrams, above, how the new, Extended Moving Breaker Plate guards against the passage of oversize material between breaker plate and front cage bar—also how added space between cage bars and back of mill assures unrestricted flow of material.

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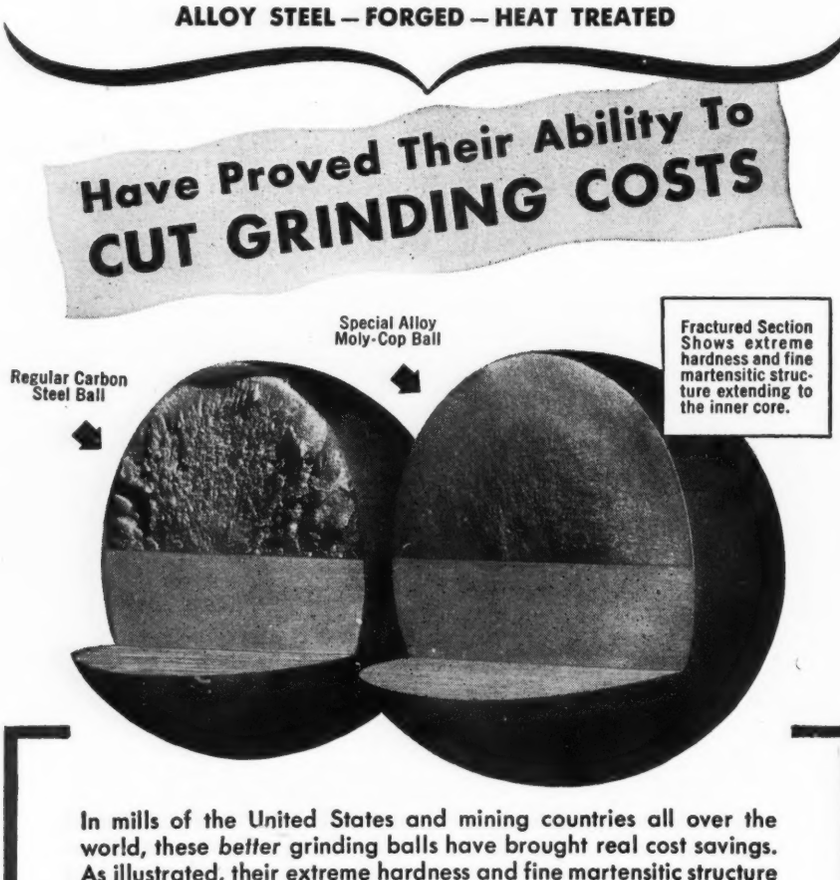

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3. Moly-Cop Balls give you more tons per mill hour because they retain their spherical shape longer than the average ball.
4. Moly-Cop Balls save your power costs because you use less power per ton of ore.
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Arizona (*Continued*)

on its mining properties "with those assessed by the several county assessors on other properties within the state." An attorney for the corporation contended that the Phelps Dodge properties should be placed at the full cash value, which he set at $96,892,969. The Arizona State Tax Commission valued the properties at $128,445,111.

★Metal production in Arizona for June was well above 1947, with 31,750 short tons of copper, 400,500 fine oz. of silver, and 9,000 fine oz. of gold. According to report of the Bureau of Mines office at Salt Lake City, the State remains the largest producer of copper in the United States, third largest of zinc, and first in total value of the five metals, gold, silver, copper, lead and zinc.

In 1947, 78% of Arizona's gold production and 54% of its silver production came from copper ore mined at Bisbee, Ajo, Jerome, Superior, Morenci and Miami. The remainder of the gold came largely from zinc-lead ore at two properties in the Big Bug and Warren districts. Approximately 98% of the copper production came from 10 mines in the Ajo, Copper Mountain, Eureka, Globe-Miami, Mineral Creek, Pioneer, Verde and Warren districts. Lead and zinc came principally from five mines in the Big Bug Harshaw, Old Hat, Pima and Warren districts.

Only about 2% of the 38,636,280 tons of ore produced in the State in 1947 was shipped crude to smelters. The remainder was treated as follows: approximately 89% at concentration plants, 9% at copper leaching plants, and less than .1% at cyanidation and amalgamation plants.

★Exercising its option rights granted by the RFC in March, 1942, the Phelps Dodge Corp. purchased a copper reduction plant at Morenci, Ariz., and a copper refinery at El Paso, Texas, two plants built during the war at a cost of approximately $25 million, which have been operating under lease by the Phelps Dodge Corp., and its subsidiary, the Phelps Dodge Refining Corp.

NEVADA

Milling begins at Copper Canyon's Lander County plant—Eureka continues unwatering of Fad shaft

★The Atlanta mine, Lincoln County, has been shipping 100 tons of gold-silver ore per day 65 miles to the Kennecott smelter at McGill. The mine is owned by Frank M. Manson; Clyde E. Collins of Carson City is engineer in charge.

★American Smelting & Refining Co. is reported to have taken an option on

30 copper claims of the Airlanes Gold-Copper Mining Co., situated on the east slope of the Stillwater range in northeastern Churchill County.

★Copper Canyon Mining Co., again operating its 350-ton flotation mill in Lander County, is treating silver-lead-zinc ore from its Hornfels orebody, opened on the 700-ft. level since the main Julie shaft was sunk from the 500-ft. point early this year. Robert H. Raring, directing engineer, reports that this ore yields a higher-grade concentrate than the copper-gold ore mined above the 500-ft. level.

Ore of similar type also is being trucked to the mill from the adjoining Tomboy mine, an open-pit operation worked by Paul Troester and associates under lease from the company. Mill-feed is to be increased to capacity as the deep-level orebody is further developed, and the shaft is to be sunk to deeper horizons.

★Eureka Corporation, Ltd. is making fair progress in unwatering its flooded four-compartment Fad shaft on the leased Richmond-Eureka property with the aid of a number of heavy-duty pumping units. It is predicted that before the end of the year the sixth, or 2,250-ft., level can be continued to the ore zone. The Eureka corporation, leasing the 200-ton concentrator at the Mt. Hope mine of the Callahan Zinc-Lead Co. to treat Ruby Hill ore, has been replacing the power plant that was burned late last year.

★Standard Cyaniding Co. has installed a charcoal precipitation unit to apply a process variation that has been tested with encouraging results in the 200-ton pilot plant of the Getchell Mine, Inc. The Standard company treats some 600 tons per day of low-grade gold ore from its open-pit mine near Rye Patch, Pershing County, compared with 750 tons in the pre-war period. It was indicated that upon resumption of the Getchell 1,500-ton cyanide mill, the new process will be employed.

★Completion of a 100-ton mill at Goldfield by Newmont Mining Corp. has been delayed by failure of essential equipment to arrive by the scheduled September 15 deadline. The water problem, believed solved when pipe was laid to the 700-ft. Laguna shaft, reappeared when the supply was found to be inadequate. A crosscut connecting with the Clermont shaft was reopened and the water supply thus obtained was said to be more than abundant for the mill operation.

★Consolidated Coppermines Corp. has discontinued underground mining through its Morris Brooks shaft at Kimberly, where the ore had been of sub-marginal grade. Its product hereafter will come from the company's open-pit operation in the west extension of the Kennecott pit.

★Calumet & Hecla Cons. Copper Co., operating through the Tonopah Devel-

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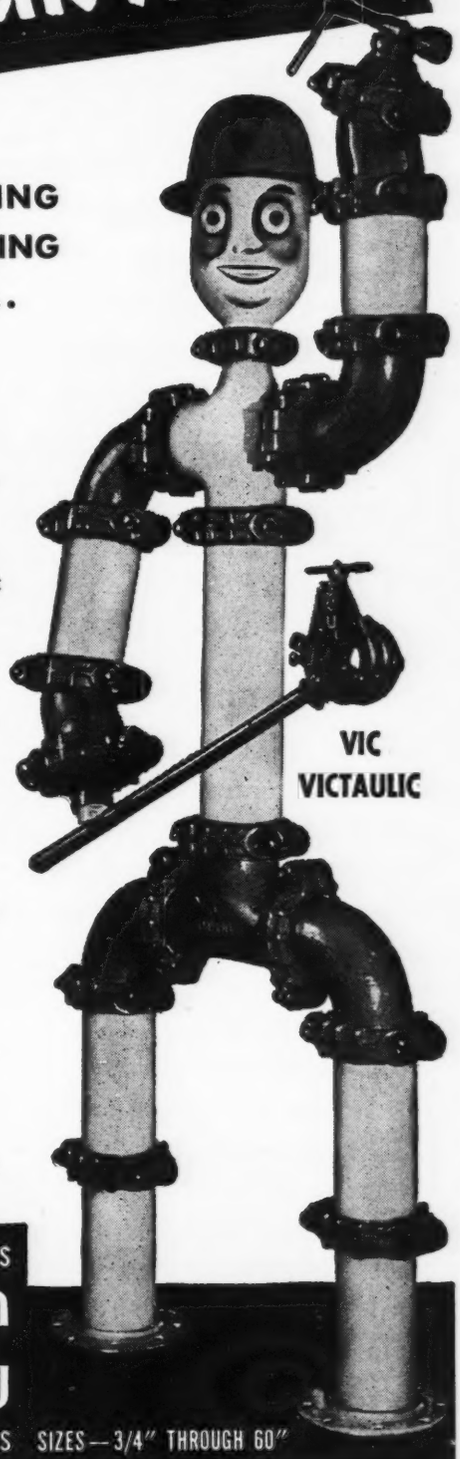

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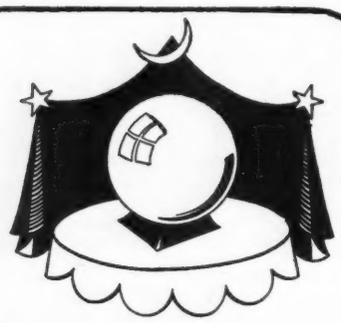

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F.I.

Nevada *(Continued)*

opment Co., was drilling a sixth deep hole on a group of claims northwest of Tonopah. I. A. Lavrooshin is the engineer in charge for Calumet & Hecla.

★Engineers acting for Kennecott Copper Corp. were said to have secured an option on the long idle Copper Kettle mine in Churchill County, a producer of copper-gold ore in early days. Roads to the mine have been repaired. Parker Liddell of Reno and E. J. Bottomley of Lovelock have owned this property for several years.

★In the Mizpah mine of the Tonopah Mining Co. Clyde Russell was reported to have been drilling holes 40 to 50 ft. on several levels prospecting for new orebodies. Ore is trucked to the Kennecott smelter at McGill.

COLORADO

Great Eastern company shipping lead-zinc ores—New group proposes extension of Big Five tunnel

★At a recent meeting of shareholders of the North American Mining Co., owners of the Big Five tunnel holdings, Dr. G. C. Ridland, consulting geologist, stated that the mines in the Russell Gulch-Quartz Hill area have recently been purchased or secured on option by a financial group represented by Dr. Ridland. The properties include the Pewabic, Pyrenees and German-Belcher, all early-day shaft workings which would be undercut by the proposed half-mile extension of the Big Five tunnel. Many properties have pitchblende ore in addition to gold, silver and other metals. The five-mile Argo tunnel is being put in working condition by an associated company.

★The Utze Lode Co. is reported in Salida to have acquired the Madonna property together with most of the claims surrounding it. Surface buildings have been erected and also a development program carried on underground. The information obtained from a diamond-drilling program by the U. S. Bureau of Mines in January was encouraging.

★Champion Mines Co., working from the 150-ft. level of the WPH shaft, on the company's WPH-Jerry Johnson lease at Cripple Creek, mined ore late in July with an assay of $273 gold a ton. The vein shows a width of 8 to 18 in. From the core of the vein an assay showed 48.8 oz. gold, or $1,708 a ton. The first ore shipment from the new strike has been made to the Golden Cycle mill.

★The Atomic Energy Commission has taken over the vanadium-uranium mill of the U.S. Vanadium Corp. at Uravan. The plant was to be placed in operation soon, receiving and milling carnotite ores.

★According to Mrs. Mary Kyto, president of the Silver Shield Mining & Milling Co., and William Page, supervising construction, Silver Shield's mill near Ouray will be completed soon after the first of the year and ready to handle the milling of ore.

★The Great Eastern Mining Co. of Silverton, Edward C. Chase, president, after devoting the first year to cleaning up tunnels, timbering and getting the mine in condition for actual production this summer, has been shipping an average of 40 tons a day of good grade lead-zinc ore carrying values in silver from 12 to 15 oz. Most of the ore is being shipped to the American Zinc Co. at Ouray for concentration, but some shipments of high-grade lead ore have gone to the Leadville smelter.

★The Joe Dandy Mining Co. of Cripple Creek is preparing to reopen the Joe Dandy mine immediately, according to A. S. Konselman, superintendent. The property has not been operated for the past several months.

★At Durango, the Incas Mines, Inc., has been organized for operation of the Incas group. Bert Thompson of Durango, who has been operating the Bessie G mine for the last nine years, has acquired a substantial interest in the Incas company and will be in charge of operations. He is planning to move in a compressor and other equipment and after reworking the trail from the May Day to the Incas will resume the driving of the Incas tunnel and do considerable raising to cut the several veins that were stoped to the surface in the upper workings.

★In a report covering metal mining activities in the State for 1947, Fred Jones, commissioner of mines for Colorado, reveals that during the past year 290 mines, 33 placers, 82 quarries and plants, and 22 custom mills were in operation, averaging 7,141 daily man-shifts.

★The first auto trip over the new route across American Flats and over Engineer Pass from Ouray to Lake City has been made. The road opens a rich, mineralized area. The distance between Ouray and Lake City by the new road over Engineer Pass is 33 miles, compared with 152 miles by way of Sapinero.

★The Atomic Energy Commission has acquired 66 federal housing units at Uravan and 50 at Naturita for housing employees of the commission and those engaged in producing ore for the AEC. Contractors are now engaged in the erection of units in the Slick Rock district for the housing of U. S. Geological Survey crews now in the field.

★The Golden Cycle Corp. early in September had only about 50 ft. to sink in its Ajax shaft on Battle Mountain at Cripple Creek to reach the

Carlton drainage tunnel level at 3,000 ft. The shaft had been sunk and timbered for over 200 ft. below the 28th level. A station was being cut on the new 30th level and men were working 60 ft. below this level. The old wooden Ajax ore house was almost completely torn down and construction of the new steel structure progressing. An old Midland railroad locomotive will be used as a boiler for heating the two ore houses, change rooms and other surface buildings.

IDAHO

Rare Earths, Inc., builds plant to treat old placer dumps—Sunshine Consolidated reports receipts

★Sunshine Mining Co., crosscutting from the 3,700-ft. level, has intersected the Yankee Girl vein and opened an 8-ft. width of good milling ore which assays indicate will average around 50 oz. silver per ton. The company is stoping on this vein on the 3,100-ft. level a considerable distance west of the 3,700-ft. level opening.

★Sunshine Mining Co., doing some fresh work in an old crosscut on the 3,100-ft. level, in what is known as the "Intervening Area," opened a 3-ft. vein of ore which is producing an average mill feed running 100 oz. of silver per ton. This area is a wedge-shaped piece of ground jointly operated by Sunshine and Polaris and highly productive down to the 2,700-ft. level.

★The Federal Mining & Smelting Co. is preparing to re-examine the old Iron Mountain mine near Superior, Mont., a producer of rich silver ore in the early days. At one time the property was opened by a deep tunnel operation of the Iron Mountain Tunnel Co., and later leasers mined and shipped several cars of high-grade zinc ore from lower levels.

★The Douglas mine in the Pine Creek area is resuming operations under the Douglas Leasing Co., successors to the Small Leasing Co. The latter company constructed a 100-ton milling plant and shipped zinc and lead concentrates until the Government's subsidy plan was cancelled and the mine closed.

★Silver Dollar Mining Co. reports a net income of $268,666 for the first half of the current year from a one-third interest in the Rotbart area operated by Sunshine. Silver Dollar has an independent shaft development on this vein structure east of the known productive area, and is drifting on the vein from the 2,800-ft. level.

★Sunshine Consolidated Mining Co., operating the western end of the Yankee Girl vein from Sunshine's 3,100-ft. level, reports net receipts of $22,421.14 for the second quarter of this

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Idaho (*Continued*)

year and $20,539.40 for the first quarter, all of which is from a half interest, Sunshine Mining Co. owning the other half.

★The Sun Valley Silver-Lead Mines Co. has been organized in the Hailey district to take over the New Hope Trust Co., which was a unit prospecting venture formed by local people for the purpose of developing a silver-lead prospect in the Hailey district. The basis of transfer is 6,000 shares of Sun Valley stock for one unit of New Hope Trust. The company first shipped several trial cars of ore from the surface and has since driven a deep tunnel which has cut through several promising vein structures.

★The Simplot Fertilizer Co., of Pocatello has offered the U. S. Government $7,574 for the privilege of renting 1,224 acres of land containing phosphate rock deposits in Caribou County, adjoining the Simplot company's Bingham County phospate rock operation. The Government specified a minimum bid of $1 an acre in addition to a minimum investment of $50 an acre within the first three years, and a minimum production of five tons an acre, beginning not later than the fourth year. The Government would also collect a royalty of 5% of the gross value of the phosphate rock mined and an annual rental of 25c. an acre for the first lease year.

The Simplot company is operating on the Fort Hall Indian reservation near Pocatello and has been shipping a large part of its phosphate fertilizer product to Japan. Recently the company has been joined by the Westvaco Chlorine Products Co., of New York, who are installing an experimental electric furnace in connection with the Simplot plant for the production of phosphorus. The Westvaco installation, which will initially provide one electric furnace, will merely constitute the first step in this new development of the Idaho phosphate industry. The Westvaco company has signed a long-term contract with the Idaho Power Co., which has extended a high-voltage line to the plant and installed a sub-station. The new plant also involves the construction of 23 miles of railway spur.

★The U. S. Bureau of Mines has announced the diamond drilling of an aluminum clay deposit near Troy which is estimated to contain 53 million dry tons of clay. The entire body of clay, represented by samples for ceramic testing, has an anticipated refractory classification of high heat duty. The overburden averages about 16 ft. in depth, with 26 ft. of clay. Average analysis of the clay deposit showed that it contained 24% available alumina and 4.7% available ferric oxide. Kaolin is the principal clay mineral and is associated with quartz, mica and iron oxide in varying amounts.

★Rare Earths, Inc., at an initial investment of $100,000, is building a new ore-dressing plant at McCall to prepare for market the several different kinds of rare earths and minerals produced in reworking old placer mining dumps at Warren and Bergdorf. In addition, Leland Waggoner, president of the company, announces that the company will start virgin dredging operations on the Ruby placer property near Bergdorf, with the I. C. Wallberg Dredging Co. in charge. The operation is expected to produce a monazite sand and gold, as well as other heavy alluvial minerals.

★James Jones has opened the "Weiser Assay Office" in Weiser.

★Albert J. Koebel, at his small pilot plant north of Sand Point, has demonstrated a smelting process in which concentrates are blown into a furnace at about 2,400° F. The concentrates, it is reported, do not melt, but the various metals—gold, silver, zinc, etc.—combine with oxygen. The metal oxides are blown through pipes to a baghouse, where the mixture of oxides is collected. The waste material, including iron, is slagged and removed from the bottom of the furnace. A standardized process for recovering the pure metal from the oxide is then used.

★Approximately 9,300 tons of ore has been blocked out in recent months at the Gem State Consolidated mine in the Pearl district, 24 mi. northwest of Boise, and enough additional ore was expected to be blocked out in the next 60 days to justify installation of a 50-ton flotation mill on the property, according to T. R. Baugh, Boise, president and general manager.

WASHINGTON

Metaline Mining & Leasing Co. will resume production — Pend Oreille construction program well under way

★When Pend Oreille Mines & Metals Co. completes its two mills, one at the Metaline Falls property and the other at the Reeves-McDonald property in British Columbia, it is expected to become the largest zinc producer in the western states. The company plans to step up lead-zinc ore production extensively next year. Excavation has been completed at the Reeves and foundations begun for the 1,000-ton mill. A 2,600-cu.-ft. compressor is being installed at the tunnel. At the Pend Oreille a road has been built to the new mill site across the Pend Oreille River and work has begun on the mill. An additional 2,600-cu. ft. compressor is to be installed there.

The company's Duntil plant is making concrete blocks for the new milling plant and for the apartment building being readied for the workers. According to Jens Jensen, treasurer, experiments in zinc reduction are con-

tinuing at the Mead magnesium plant. If the tests are successful, ore concentrates will be treated there and 100 tons of zinc metal produced daily.

★Judge W. Lon Johnson of Stevens County signed an extension of the temporary restraining order Aug. 24, in the Spokane County superior court, against the International Union of Mine, Mill & Smelter Workers, CIO, local at Metaline Falls. American Zinc, Lead & Smelting Co. sought the permanent injunction which prevents mass picketing and violence at the company's Grandview mine. The order signed by Judge Johnson permits two union pickets at each of two entrances to the mine and mill and demands "peaceful persuasion" in union activities. The $5,000 bond set Aug. 3, when a temporary restraining order was obtained by the American Zinc company, was continued in force.

★Metaline Mining & Leasing Co., which shut down production at its zinc-lead property in the Metaline Falls district when the Government ended premium payments last year, will resume production as soon as labor conditions permit, President H. Louis Schermerhorn said. Operations will be directed by the company's vice president, James L. Leonard, of Spokane. Over 100,000 ft. of underground drilling and almost 50,000 ft. on the surface are reported to have shown large ore deposits. During the past year development work has continued, the incline shaft has been sunk 200 ft. to the 1,700-ft. level 340 ft. below the main 4,500-ft. haulage tunnel, and diamond drilling has continued. The Metaline company took over active management of the mine Sept. 1, from American Zinc, Lead & Smelting Co. which has operated it for several years.

★The new metallurgical research laboratory at Trentwood has been completed and will be in full operation this fall, according to Dr. Paul Ziegler, research director of Permanente Metals Corp. Dr. Ziegler will direct nine separate laboratories, each handling a specific phase of research. The two broad fields to be studied are the fundamental problems of aluminum production and the development of new products and their applications.

Trentwood plant production was 227,785,658 lb. of aluminum products during the year ending May 31, 1948, or an increase of 67,000,000 lb. over the previous period. The Mead plant's output during the same period increased by almost 73,000,000 lb. of pig aluminum over the previous year.

★Leadpoint Electric Mining Co. has been concentrating its low-grade lead dumps at its Electric Point mine, in Stevens County, and shipping its product to the Bunker Hill smelter. Plans were to start milling the 5-6% lead dumps of the Gladstone Mountain Mining Co. early in September. A new body of high-grade lead was recently discovered at the Gladstone

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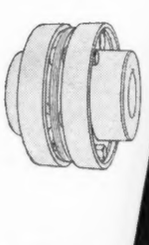

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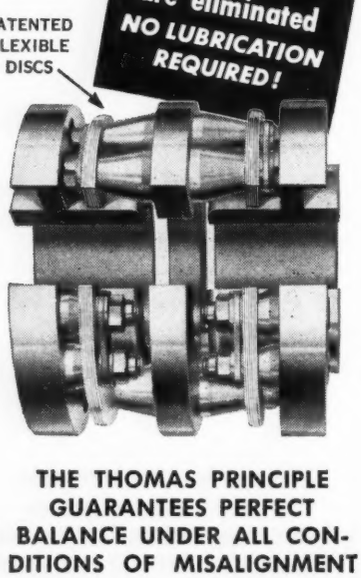

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Washington (*Continued*)

property and lessees were reported sinking on this.

★The cement plant at Metaline Falls purchased 2,000 tons of cremate ore from the Shellenberger property in British Columbia this season, and expects to ship in 7,000 tons next year from the mine. The iron is added in small quantities in the cement to eliminate shrinkage.

★Plans are underway for immediate erection of a million-dollar sulphuric acid plant, using the contact process, by American Smelting & Refining Co. on its smelter property at Tacoma, according to E. R. Marble, manager there. It was reported that the plant would be opened in 1950, with a capacity of over 100 tons a day.

★Chromium Mining & Smelting Co., employing 75 men, was operating one furnace in August at its Mead plant, near Spokane, and expected to add about 40 men when starting tests of a second furnace in early September, according to E. Hnatuk, superintendent. The second furnace will probably go into production in October.

The ferrochrome silicon produced is shipped to the company's plant at Riverdale, Ill., where it is made into exothermic alloys to be used in steel and iron mills. The chromite is shipped to Mead from New Caledonia, while the silicon is obtained from quartz at Dennison, near Mead, and limestone from the northern part of the State.

★The War Assets Administration has approved the $382,500 bid of the Keokuk Electro-Metals Co., Keokuk, Iowa, for purchase of a ferrosilicon plant constructed by the government near Wenatchee, Wash., during the war. The approval was made on the understanding that the company would operate the plant at its present site, rather than move it elsewhere.

★American Chrome & Magnesium Products, Inc., of Washington, D. C., has started preparations for diamond core drillings in its chrome deposits in the Twin Sisters area, Skagit and Whatcom Counties. The company plans to build a 1,250-ton chrome concentrating mill near Hamilton and other mills at a port site to be named later, for the purpose of stockpiling chrome briquettes for the government. Alwayn H. Wild, president of the company, inspected prospective mill sites recently at Bellingham, Mukilteo and Anacortes.

NEW MEXICO

★In mid-August officials of the American Smelting and Refining Co. announced that their Ozark mill at Magdalena was to start buying and concentrating ore soon. The mill has been treating lead-zinc ores from the A. S. & R.'s Graphic-Waldo property and from old dumps of other company holdings in the district. Custom treatment at the Ozark is expected to bring about considerable activity among small lead-zinc properties in the vicinity that have been inoperative for some time due to the freight haul of approximately 200 miles to the nearest custom mill.

★Conclusion of new wage agreements resulting from extended negotiations puts mining operations on an even keel again in Grant County. It is expected that production figures for copper, lead and zinc from that area will considerably exceed the 1947 figures. Extensive exploration and development projects are under way in the district with the result that established reserves are at an all-time high.

MONTANA

Small mine operators organize at Safety Council meeting—Morning Glory Mines to start production

★Morning Glory Mines, Inc., operating the Keystone property in the Yak mining district, expects to commence production in the near future. The company recently acquired adjoining mining claims and now owns 23 claims along the strike of a wide mineralized zone. The ore contains lead, zinc and gold, and work is being carried on through a tunnel. A selective flotation plant, with capacity of 150 tons per day, has been completed. The company's surface investment is over $200,000.

★Ashley Strasburger Engineers recently incorporated with headquarters in Butte, to succeed the old firm of Strasburger Civil & Mining Engineering Co. of Butte and the Ashley Engineering Co. of Coeur d'Alene, Idaho. V. A. Ashley is president; E. J. Strasburger, vice president, and Vincent P. Slatt, secretary-treasurer.

★Jardine Mining Co., Jardine, has temporarily suspended operations, according to Gailen T. Vandel, vice president and general manager. The company lost its cyanide plant by fire last May and expects to rebuild some time next year. Operations covered the production of gold-arsenic concentrates, which were treated in the cyanide plant, and gold bullion shipped to the Mint.

★International Minerals & Chemical Corp. has temporarily suspended operations at its phosphate property near Hall, Granite County. J. W. Cooksley, in charge of the Montana phosphate division of the company, will make his headquarters in the main office at 20 North Wacker Drive, Chicago.

★Basil Mason, chief clerk of American Smelting & Refining Co., stated

at a recent luncheon of the Helena Lions Club, that the East Helena plant of A.S. & R. handles 260,000 to 275,000 tons of ore and concentrates each year and produces 55,000 to 65,000 tons of lead; 4,000 to 4,500 tons of speiss; a copper sulphur and zinc dross and 1,000 tons of matte.

★The Holter Research Foundation, Helena, a non-profit scientific research corporation, announces that as a service to the community it will make free radioactivity tests on ore samples. Equipment available at the Foundation laboratory is more sensitive than the average portable Geiger counter and tests will be made on samples sent or mailed to the laboratory.

★Small mine operators of Montana permanently organized the Montana Mining Section, National Safety Council, at the first convention of the organization held at Butte on August 21 and 22. Temporary officers were reelected, including Walter H. Myers, Virginia City, president; R. B. Shelledy, Garrison, first vice president, and Oscar A. Dingman, Butte, secretary-treasurer. J. R. Haslip, East Helena, was elected second vice president.

IRON COUNTRY

Mountain Iron washing plant now in operation—P-M's pelletizing plant at Aurora makes adjustments

★Most of the mining companies of the Lake Superior region signed agreements with United Steelworkers (CIO) Union about mid-August for an increase in hourly wages ranging from 9½c. to 17c. per hour, retroactive to July 16. This contract, extended to May 30, 1950, provides a raise of 9½c. an hour for common labor and 9½c. for labor classifications in the upper brackets. A few will get the 17c. raise. The agreement also provides that either the company or the union may reopen negotiations in 1949 on wages and social benefits only.

★Good progress is being made in unwatering the Champion mine near Ishpeming, Mich. The water level is now below the 1,000-ft. level. The mine should be completely dry in October. Besides the 40x80-ft. Quonset building used for a combination office, dry shop and engine house, a steel headframe brought from Isle Royale No. 7 is being erected. From its main line in Champion the D.S.S.&A. Ry. is building a two-mile spur to the mine site. The mine should be operating in November. North Range Mining Co. is the operator.

★At Mather "B" shaft, Negaunee, Mich., sinking continues. The shaft is now close to 1,400 ft. deep. A mechanized clamshell, developed from parts of a Bucyrus-Erie hydro shovel, is

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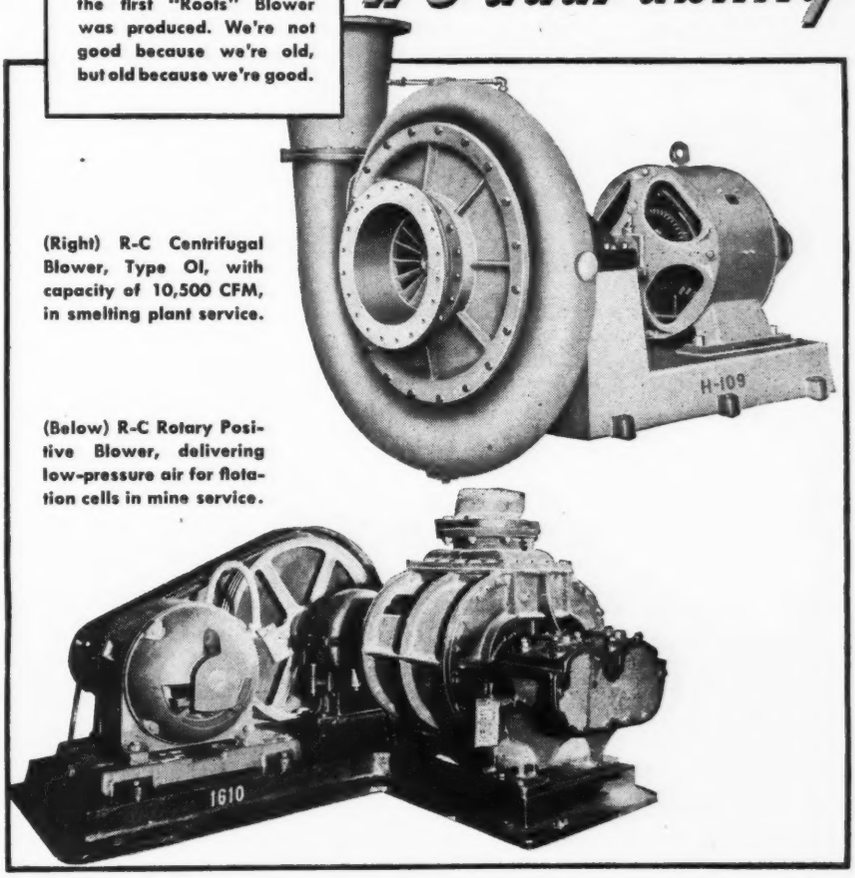

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Iron Country *(Continued)*

being used in the shaft to remove the blasted rock. Use of this has proved faster than manual labor. The device is compact enough to permit handling easily in the shaft. McDonald and Kaake, contractors on the engine house, are making good progress and hope to get the building enclosed before snow flies.

★A contract has been given to the Edward H. Mayer Co., Oshkosh, Wis., to build the basement of the new research laboratory for Cleveland-Cliffs Iron Co. This work is completed to the point of pouring the reinforced concrete for the first floor.

★The Inter-State Iron Co. is preparing to diamond drill the Section 25 and Section 30 properties at Ely on the Vermilion range on which it holds options.

★The Inter-State Iron Co.'s Columbia mine at Virginia established a new record during June when it produced 156,608 tons of ore. July 6 was the season's record day with 8,251 tons of ore shipped.

★The August issue of Jones & Laughlin's "Men & Steel" contains an interesting chart of the organization of the Inter-State Iron Co. on the Mesabi range. Headed by Grover E. LeVeque, vice-president, and H. F. Kullberg, general superintendent, it shows the personnel of the clerical, grading and engineering departments of the headquarters office and the heads of departments at the various mines.

★At Butler Brothers South Agnew mine, the 25-cu.yd. dragline in July moved 538,098 cu.yd. of dirt. The best 24-hr. record was on July 18, when 27,800 cu.yd. of stripping was handled.

★Union Construction & Dredging Co. is excavating part of the drained bed of Rabbit Lake at Crosby on the Cuyuna range for Pickands, Mather & Co.

★An award by Butler Brothers for the best group of suggestions submitted from April 1, 1947 to April 1, 1948 was given to Ted Stenberg. The grand prize award is a $1,000 scholarship fund to be used for the children of the winner.

★A group of coal mining officials flew to Hibbing recently in two planes operated by Hercules Powder Co. The purpose was to inspect open-pit mining. The party returned on Aug. 20. On Aug. 31 and Sept. 1 a party of Lake Superior mining officials visited the Hazleton area in the Pennsylvania anthracite field to study strip mining there. This trip likewise was arranged by the Hercules company.

★Rudolph T. Elstad, Duluth, president of the Oliver Iron Mining Co., addressed the employees of the Soudan mine on the Vermilion range Aug. 20 on the occasion of the presentation of Certificates of Honor for having worked through 1947 without a lost-time accident. Mr. Elstad gave the individual men credit for the record and said that, actually, the record extended back for 22 months. He urged employees not to "check their safety consciousness at the gate" as they leave the job; but to take it home with them and set a personal example for family, neighbors and associates.

★A new Bucyrus-Erie 7W dragline has been received at Cleveland-Cliffs Canisteo mine at Coleraine. It is equipped with a 7-cu.yd. bucket and has a 140-ft. boom.

★Oliver Iron Mining Co.'s new washing plant at Mountain Iron, Minn., is now in operation. It serves the big open pit.

★Pickands, Mather & Co. is constructing a large addition to its general office building at Hibbing, Minn.

★Oliver Iron Mining Co. has awarded contracts for construction of shop buildings at the Monroe and Sherman (formerly the South Frazer) mines. Each building will be 120x168 ft. and will be used for locomotive and car repairs and for the usual railroad equipment maintenance. Water storage tanks and fuel supply stations for locomotives are also included.

★The Erie Mining Co.'s new pelletizing plant operated by Pickands, Mather at Aurora, Minn., is going through the adjustment period that is usual in every new plant, particularly in one pioneering in a new field. Pellets have been and are being produced, but they are not yet up to the standard expected by those responsible. These cut-and-try experiments necessarily require time. No definite date has been set for continuous production.

★Inland Steel Co. is continuing to unwater the Bristol underground iron mine at Crystal Falls and expects to be prepared to mine ore soon. In the meantime, surface buildings are being repaired and made ready for use.

The Inland company has acquired all the stock of the Jackson County Iron Co., fee owners of a low-grade iron-bearing tract near Black River Falls, Wis. Some test drilling and sampling has been done at the property.

★Jones & Laughlin Ore Co.'s Vicar mine at Wakefield has cut its first level station at 466 ft. below the collar. The modern dry and engine house buildings are completed. Most of the shop equipment has been installed.

★Stocks of iron ore on hand at lower lakes were 32,610,785 tons on Aug. 1 compared to 28,440,332 tons one year ago. July consumption was a little less in 1948 than in 1947.

★Hanna Coal & Ore Corp. is deepening its Clifton mine shaft at DeGrasse, N. Y., to open up a second level. The mine was developed as an open pit but was converted to underground several years ago. The ore is magnetic and

is treated by magnetic concentration.

★Butler Brothers Kevin mine and Patrick plant have continued to work three shifts, six days a week on the Mesabi. The Harrison plant has been working on a single-shift basis on ore from an outside company. One shovel worked in rock stripping at the Carol mine intermittently. During the previous month, several tests were made on the hoist installation at the Gallbraith. The Weggum washing plant operated two and three shifts per day, while the drying plant operated only intermittently.

KENTUCKY-ILLINOIS

Patrick mine to resume operation—New fluorspar company purchases Marion flotation mill

★The Rosiclare Lead and Fluorspar Mining Co. has purchased mineral rights of the Hillside mining property in Rosiclare, Ill., from Inland Steel Co.

★Alco Lead Corp. expects to resume operation at the old Patrick mine, four miles south of Peters Creek in Hardin County, Illinois, November 1, according to Kenneth Ingle, of Evansville, Ind., president. The Patrick, mining lead exclusively, is the only open-pit operation in the Kentucky-Illinois district. A sink-float plant installed last February at Alco's Mineral Ridge mine in Kentucky will be moved to the Patrick mine, where a new mill is under construction.

★The C. and L. Fluorspar Co., a new Kentucky mining company recently organized by Hobart Crider and Cecil A. Lennon, has purchased the Marion mill of the Minerals Flotation Corp. The company has acquired two fluorspar properties, the New York-Kentucky mine and the Hewitt mine, in Caldwell County, and ore from both mines will be handled at the Marion flotation mill.

★Ozark-Mahoning Co. has completed concreting of an old 100-ft. shaft at the Commodore mine, a lead-zinc-fluorspar producer in Crittenden County, and plans extension to 250 ft.

★Alcoa Mining Co. is completing construction at its Rosiclare plant of a new pre-fabricated steel and aluminum sheeting storeroom.

TRI-STATE

Labor Day brings back-to-work trek in Tri-State—Federal M. & S. Co. prepares for Duenweg operations

★With final settlement September 4 of the long-drawn-out Eagle-Picher

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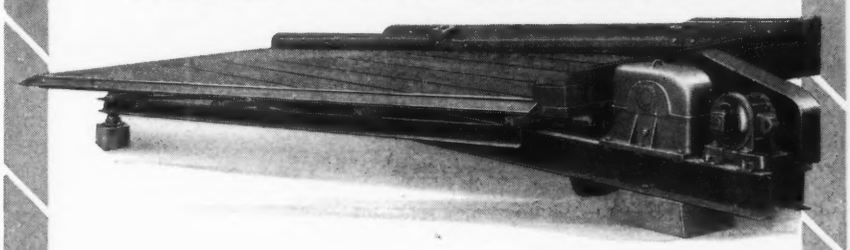

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Tri-State (*Continued*)

strike, the Tri-State zinc-lead mining industry began to recover from the devious course followed during the work-stoppage period. Production-wise the mining field is expected to regain its pre-strike rate of some 4,000 tons of zinc and lead concentrates weekly within a short while. The trek back to work by miners and millmen began in full swing on Labor Day.

The new contract between Eagle-Picher and the MMSW local, providing an average wage increase of 14.2c. an hour and giving the company sole right to pass on qualifications of all employees at the firm's big Central mill, was signed September 4 at Cardin, Okla. At the outset of the strike the company offered an average wage raise of 10.2c. an hour, and voluntarily increased this to 13.2c. following an advance in the price of slab zinc from 12c. to 15c. per lb., East St. Louis, on July 28. The company insisted on the qualifications provision throughout the negotiations, which ran into ten conferences over a nine-week period.

The negotiations remained stalemated until a back-to-work movement got under way the week prior to Labor Day and the formation of the independent Union of America rapidly gained momentum among some 1,500 men affected by the work stoppage throughout the Tri-State. In addition to 600 Eagle-Picher employees affected by the strike, several hundred miners employed by a score or more other companies in the district shipping ore to the Central mill were forced into idleness throughout the period. Between 75,000 and 100,000 man-shifts were lost, more than a million dollars in wages, and approximately 15,000 tons of zinc concentrate and 3,500 tons of lead concentrate output were lost at an estimated value of more than two million dollars.

★Federal Mining & Smelting Co. is dewatering its Duenweg mines east of Joplin in preparation for the resumption of mining and milling operations which will employ some 100 men, according to Ward C. Ball of Baxter Springs, Tri-State superintendent of the company. Operations were suspended in the Duenweg area shortly after expiration of the premium price plan last year, and the Duenweg mill was last operated on custom ore in March.

★Wildwood Mining Co. has purchased the old Northside mill near Chitwood, from George W. Moore and associates, according to George W. Potter. Mr. Potter is stripping with bulldozer and power shovels some shallow "diggins" in the Roaring Springs hollow on the ranch for lead-ore and "dry-bone." He reopened the Mattes mine on the ranch several months ago and contemplates mining from there a deeper run of zinc ore which, like the lead ore, will go to the Northside mill.

★Goldfield Consolidated Mines Co. has acquired the Wentworth mine and mill holdings of the Century Lead & Zinc Co., according to J. V. Reynolds of Webb City, manager of the latter company. Mr. Reynolds will continue to manage the properties under the western mining firm. The new operating company's contract with the Craig Mining Co. for mining activities in the Wentworth area will continue under the present arrangement, Reynolds said. He also announced that the company plans an extensive development and expansion program in the area.

MICHIGAN

Inflated costs absorb copper price increase for C. & H.—Union seeks strike vote—Quincy renews contract

★In explaining the passing of the quarterly dividend, E. R. Lovell, president of Calumet & Hecla Consolidated Copper Co., stated that the recent increase of 2c. per lb. in the price of copper had largely been absorbed by sharp advances in the cost of supplies and freight rates, leaving little for possible wage increases or for the shareholders.

"Because of inflated costs, the amount needed to conduct the company's business is greater than ever before," he added. "For example, the amount required for ordinary inventory purposes is double prewar needs. Furthermore, depreciation allowances are insufficient to finance today's replacement cost of obsolete and worn out equipment."

Calumet & Hecla's expansion and rehabilitation program is progressing favorably, according to President Lovell, although behind schedule because of slow deliveries of equipment and materials. At the Calumet division in Northern Michigan, the addition to the Lake Linden power plant, to cost $2,500,000, will be completed next spring. The task of placing Seneca No. 2 shaft in operation, at a cost of over $1,500,000, is moving ahead satisfactorily. New diesel-electric locomotives are in operation, replacing old steam locomotives on the company railroad.

The company's new tube mill at Decatur, Ala., built at a cost of $8 million, has started. As new employees are hired and trained, production will gradually increase.

The rich tailings bank at the Lake Linden reclamation plant is now exhausted. The loss of this low-cost copper will seriously affect earnings at the Calumet division. The management hopes to offset this eventually by profits from new activities.

★Local No. 584, UMMSW-CIO, bargaining representative for Calumet & Hecla employees, has rejected all offers of a new contract and has authorized plans for a strike vote. Some of the company's proposals were: A 5c.-an-hour wage increase; a hospitalization plan; a change in the present seniority clause; elimination of the rent, lease and water clause in the existing contract; and a new vacation plan.

★From retreating stamp sand at its reclamation plant at Mason on Torch Lake, Quincy Mining Co. made a net operating profit of $175,449.62 for the first six months. The work continues on a satisfactory basis. Recovery during the first half was 2,559,241 lb., an average of 4.81 lb. of refined copper per ton. The sands were of a better grade than in 1947, when an average of 4.33 lb. per ton was recovered.

Quincy's contract with the CIO union, which expired on June 30, was renewed for another year without change except for a wage advance of 9c. per hour.

★North Range Mining Co. has finished sinking the shaft of its Book mine at Alpha to 550 ft. where a new level is being driven. A new hoist has been installed. Ore will be hoisted through the shaft soon.

★The Cliffs Power & Light Co. has ordered five 1,000-kw. hr. diesel-generator sets. They are of the same type as the five recently installed at Ishpeming. The company will also start construction of a large steam power plant at the same location soon. Stone & Webster are doing the engineering work.

★Quincy Mining Co. is completing 100 years of copper mining in northern Michigan this year. During the century it has had but eight presidents. E. P. Hastings was the first. W. Parsons Todd has held that office since 1924. During its 100 years the company has produced over 357,000 tons of copper and has paid $27 million in dividends.

★Calumet & Hecla Consolidated Copper Co. has agreed to assist the Upper Peninsula Power Co. during the current water shortage by turning into the latter's power lines such excess electricity as they can make available. This is the second time in the past year that C. & H. has come to the assistance of the power company. The shortage, due to lack of water in the drainage area, is sufficiently serious to cause the power company to urge the public to avoid unnecessary use of electricity.

CANADA

Bureau reports growth in mining employment for June—Sherritt Gordon continues exploration program

★Canada's foreign trade in nonferrous metals and their products showed decreased imports ($78,892,-

000 down to $77,125,000) for the first half of 1948 compared with the same period a year ago. Over the same six months exports jumped almost $50 million to $190,138,000. Although exports of non-metallic minerals and their products increased moderately in the half-year period to $41,402,000, imports in the same category advanced from $192 million to $262 million. Exported iron and its products dropped $6 million to $132,262,000 in the first half of this year, and imports expanded some $31 million to $393,393,000. Increased business in other categories (paper, agricultural and animal products) had the net result of a favorable trade balance of $131,042,000 for the half-year period.

★The continued Communist control of several large labor unions in Canada has led to the two-year suspension from the Canadian Congress of Labor of Hervey Murphy, regional director of the International Union of Mine, Mill and Smelter Workers. The union has been suspended for an indefinite period from the CCL, but an attempt is to be made in October to give favorable consideration to an application by the mine workers union for reinstatement in the CCL.

★The mining industry showed important expansion in employment in June, according to the Dominion Bureau of Statistics. There was an overall advance of 1.6% in employment since May 1, in spite of a downward trend in the coal fields. Reports from 658 leading operators showed improvement, the index of employment advancing to 175.0 compared with 157.3 at June 1, 1947, a gain of 11%. In the year, payrolls advanced 30.7% to $48.52 per capita from $41.17. The mining industry reported 77,500 employed Mar. 1, 1948, an increase of 21.4% over the previous year and 2.5% higher than in 1939. The total number employed increased to 82,260 on June 1, 1948, only 1.2% lower than in 1941 when the industry was operating close to the wartime peak.

QUEBEC

★Mineral output for the province, as reported by the Quebec Department of Mines, showed substantial increases for the first seven months of 1948. Silver jumped 42% over the same period last year, cement was 26% higher, and gold was up 24%. Clay products and lime each advanced 15% and asbestos improved 6% with 390,471 tons produced to the end of July. Gold output for the seven months amounted to 428,238 oz.

★July production at Golden Manitou Mines of about $270,000 gave an estimated operating profit of $150,000, bringing the figure for the first seven months to $547,798. For several months the 1,000-ton mill has been running at capacity, an average grade containing 5.5% zinc being maintained. In October shaft-sinking is to

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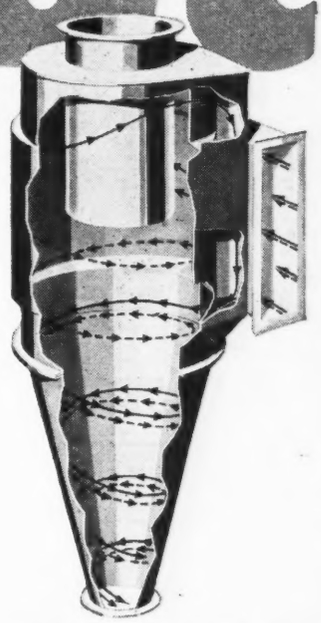

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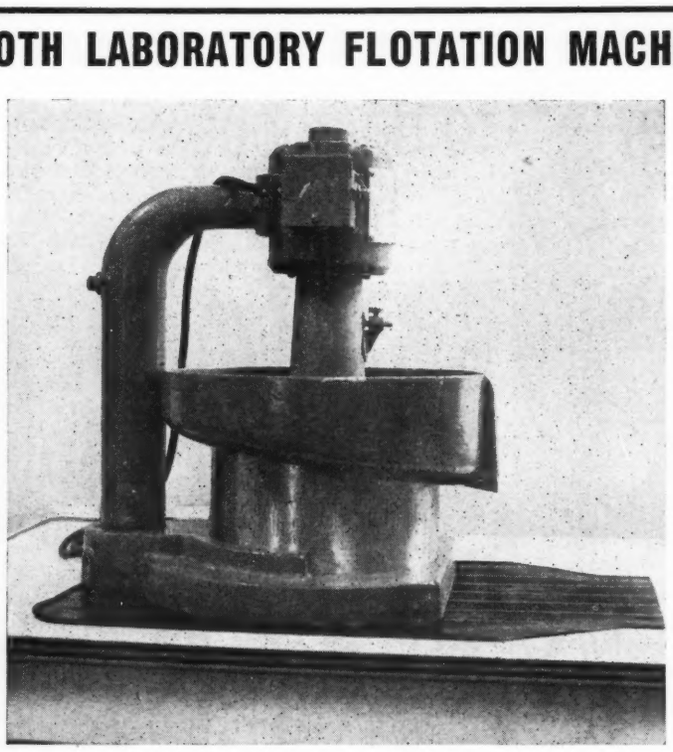

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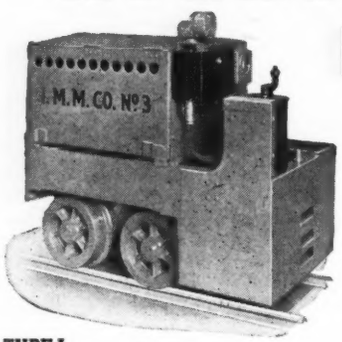

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Canada (*Continued*)

be resumed to open up three or more new levels. A lead flotation unit was installed in 1943 and expanded two years later. Andrew Robertson is mine manager.

★A light X-ray diamond drill was shipped by plane late in August to the concession of the Quebec Labrador Development Co. This was to be used while weather permits, probably to the middle of September, to test limonite showings in muskeg located near the north end of the property. Dr. W. G. Wahl, geologist, has reported two mineralized areas, each 2½ miles in length and one-third mile wide, which may be surface alteration of hematite ore.

ONTARIO

★In the first half of 1948 Ontario produced 997,832 oz. gold and 199,666 oz. silver, as reported by the Ontario Department of Mines, an increase of 43% for silver and 1.48% for gold, recovered from 4,087,612 tons of ore. Gold mines employed 12,811 men at the end of June, the highest figure since February, 1948. Grade of ore treated in June averaged $8.45 per ton.

★M. S. Fotheringham, vice president and general manager of Steep Rock Iron Mines, reports that production for this year will be reduced to about 900,000 tons as a result of a shutdown from July 14 to August 11. The delay was due to stripping operations on a larger scale than anticipated. In September production was reported to average 10,000 tons daily.

★The Helen and Victoria iron mines, operated by Algoma Ore Properties (Algoma Steel Corp.), have been prepared for a 50% increase in output, to about 3,000 tons of siderite a day. Underground mining is being prepared to supplement open-pit operations. Total shipments this year are estimated at 550,000 tons. Complete mechanization has reduced costs. Block caving is used in large stopes, the ore passing by gravity through raises to an underground crusher, where a series of conveyor belts moves it to surface. A new 72-in. sintering machine is being added to the present 60-in. machines at Wawa, connected with the mine by aerial tram. George W. MacLeod is general manager and C. M. Beck is mine superintendent.

★Lake Shore Mines reported net profit of $1,207,886 for the year ended June 30, a reduction of $176,287 from the previous fiscal period. The ore grade averaged $14.62 per ton for total output valued at $4,697,785. It was estimated that bonus payments from Ottawa on the first six months of 1948 would amount to about $50,000, payable at the end of the year.

Drifting had been started on three new deep levels down to 6,325 ft.

Deepening the No. 4 shaft has reached 7,217 ft. with the present objective at 8,000 ft., which will make it the deepest shaft in North America. On the adjoining Wright-Hargreaves property the shaft is bottomed at 7,272 ft. Proven ore reserves were stated to be highest in the mine's history, but some sections of ore had been discarded as unprofitable due to rising costs. J. C. Adamson is mine superintendent.

MANITOBA

★Sherritt Gordon Mines, Ltd., reports earnings during the second quarter of 1948 substantially higher than in the preceding three months. Copper sales were 5,263,792 lbs. compared with 1,375,135 lbs. in the previous quarter. Profit realized before write-offs was $474,797 as compared with $203,126, and for the half-year amounted to $677,923 as against $729,253 in the corresponding period of 1947.

★An intensive exploration program has been carried out in the Sherridon area. Results obtained were somewhat disappointing in that no appreciable copper values were obtained from deposits of pyrite probed. Diamond drilling is still in progress on the Weldon Bay group of claims approximately 15 miles south of Sherridon. So far, only low-grade material has been intersected, the best section running 1.6% copper over 4 ft.

★At Sherritt's Lynn Lake property, deep diamond drilling for geophysical survey work is continuing, with two holes completed. The second hole intersected ore between 2,064 and 2,083 ft. assaying 1.18% nickel and 0.75% copper. A new norite plug has shown erratic nickel-copper mineralization in drilling but assay results are low.

★Hudson Bay Mining & Smelting Co. reported net earnings for the first six months at $7,591,000 or $2.75 per share on 2,757,973 shares issued, after deduction of operating costs, depletion and taxes. For the fiscal year 1947, the company showed profits of $4.54 per share.

★Ruby Silver-Lead Syndicate will explore a silver-lead-zinc showing near the northeast end of Herb Lake. A magnetometer survey has revealed new possibilities and drilling has been recommended. R. J. Jowsey and associates are interested in the Syndicate.

★Jowsey Island Gold Mines, Ltd., at a meeting in Winnipeg, decided to wind up the affairs of the company. The large group of claims held in the God's Lake area is to be offered for sale to the highest bidder. God's Lake Gold Mines, Ltd., holds approximately 65% of the issued capital.

★Ogma-Rockland Gold Mines, Ltd., reports July production as $55,754 from 4,034 tons of ore milled. This represents a recovery of $13.62 per ton at 130 tons a day.

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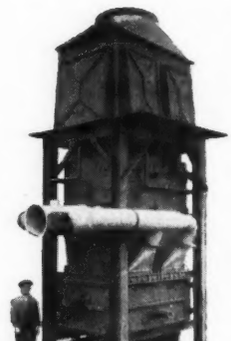

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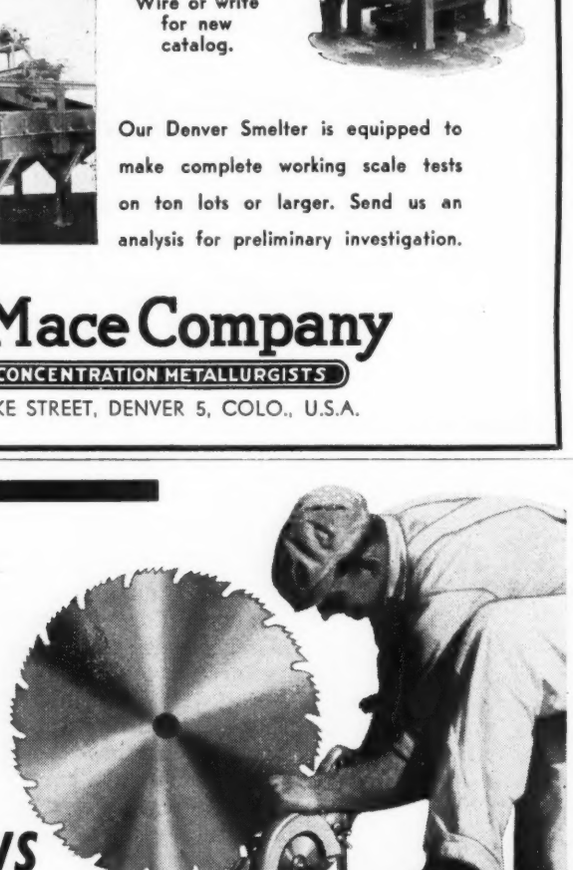

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Canada (*Continued*)

★Macdic Copper Mining and Smelting Co., Ltd., a newly incorporated company with a Manitoba charter, proposes to diamond drill and resample a copper and zinc showing on the "Ideal" group of leased claims located on Cold Lake west of Sherridon.

★The Bureau of Statistics reports gold production for Manitoba and Saskatchewan during May as being 15,010 fine oz. against 14,885 for May, 1947.

BRITISH COLUMBIA

★Findings of conciliation boards appointed to hear disputes between companies and employees at Bralorne Mines, Pioneer Gold Mines of B. C., and Taku River Gold Mines, have provided a complete reversal of the trend shown in previous conciliations at other gold mines. Majority recommendations for wage increases and other concessions for employees of Cariboo Gold Quartz Mining Co., Island Mountain Mines Co., and Silbak Premier Mines were in each case refused by the respective managements. In the case of Silbak Premier, the management has closed down the operation following union insistence that a voluntary wage increase of $1 per day be made retroactive at an estimated cost of $40,000.

In the case of the Bridge River mines and Taku River's Polaris-Taku operation, majority reports of conciliation boards recommended that no further wage increases be paid during the present difficult operating period for gold mines. Advising that further wage increases would endanger the continued operation of the gold mines, the majority report of the Bralorne board said, "not only would the closing of the mine be a severe blow to the entire gold mining industry in British Columbia and to the economy of Canada as a whole, but what is of even greater moral significance is the fact that such closing would directly affect some 350 miners, many of them married and established at Bralorne with their wives and families."

★A much brighter picture accompanied by comparative stability in labor relations is provided in the case of the base metal mines where high prices have permitted substantial wage increases. Effective September 1, employees of the two major B. C. copper mines were receiving the fifth copper bonus, introduced when the recent copper price increase had been operative for the required 30-day period. Employees at Britannia Mining & Smelting Co. and Granby Consolidated Mining, Smelting & Power Co. operations are now getting a total of five copper-wage bonuses aggregating $1.25 per shift over base pay.

★Discoveries of radioactive minerals in the Bridge River district of British

Columbia have led to a staking rush reminiscent of the gold boom of the early 30's in that area. Scientific prospecting by Ernie Johnson, field scout, and his associates, definitely established the presence of uraninite, a high-grade crystalline form of pitchblende, at the Gem and Jewel properties on Roxey Creek, near Goldbridge, B. C.

Both the Gem and Jewel have been subjected to previous development as gold prospects. Cobalt in possibly commercial quantities has also been found at the Gem mine. This latter property is held by J. M. Taylor, of Taylor (Bridge River) Mines, Ltd. The Jewel property is held on option by Egil Lorntzen and associates of Vancouver. Johnson, Lorntzen and partners have formed the Pacific Uranium Syndicate to prospect and develop radioactive occurrences on the Jewel claims and other holdings in the vicinity. Some 300 claims have been staked and recorded in the Gun Creek area, but sufficient work has not yet been done to determine whether the occurrences of radioactive ore are of commercial extent.

★A contract has been let for delivery of 250,000 tons (50,000 tons per month) of iron ore to be mined from known deposits on Texada Island, B. C., for shipment to Japan. The Texada Island iron ore deposit includes 5 million tons of proven and 4 million tons of probable hematite ore. The property is owned by Puget Sound Iron Co., of San Francisco, and is held on option by D. S. Tait of Vancouver.

★During the second quarter of 1948, the Granby Consolidated Mining, Smelting & Power Co. treated 4,515 tons daily for an aggregate of 410,884 tons as compared with 452,500 tons in the first quarter. Flood conditions accounted for the reduced tonnage. Copper production was 6,169,696 lb., against 6,351,876 lb. in the preceding quarter. Raising, drifting and crosscutting amounted to 4,342 ft. Net profit was $113,574, as compared with $113,118 in the first quarter. The management announced that delays in delivery of equipment will set back installation of additional mill capacity for two or three months.

★As soon as ore now developed in the upper workings of the Mascot fraction has been exhausted, Hedley Mascot Gold Mines will suspend operations. The company has announced that the shutdown will continue until there is a higher price for gold, a substantial reduction in operating costs, or a satisfactory amendment in the Canadian Government's Emergency Gold Bonus Act.

★Drifting on the Horsefly vein of the Nighthawk property, controlled by the Hedley Mascot company, has opened 140 ft. of ore averaging 0.50 oz. gold per ton across 6.0 ft. Diamond drilling will test for extensions laterally and to depth. Development work is also being continued on the

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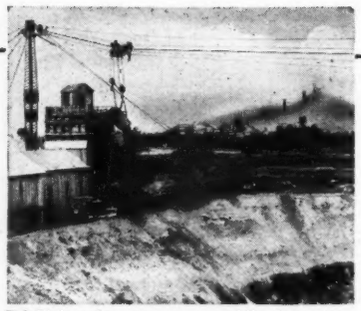

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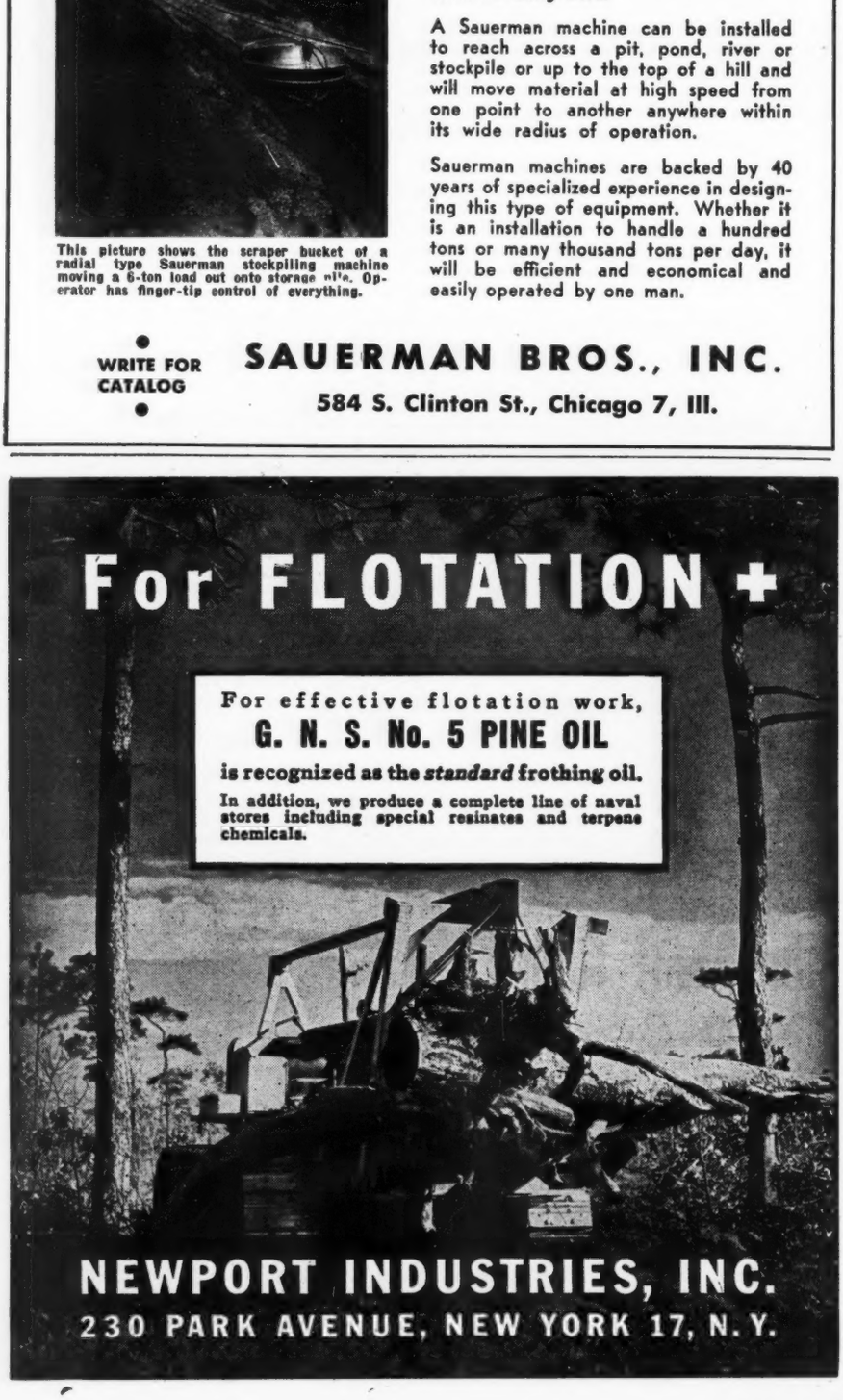
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Canada (*Continued*)

3,700 level in the Mascot claim where a branch tunnel has entered the Zeerust and Florence claims.

★Shareholders of Silver Giant Mines have approved an offer of Siscoe Gold Mines whereby the latter company will take over this Spillimacheen lead-silver mine and proceed immediately with development leading to early production. When 140,000 tons of positive ore have been developed, Siscoe is committed to erection of a mill with daily capacity of from 300 to 500 tons.

YUKON

★Production from operations through July, 1948, of the Yukon Consolidated Gold Corp. had recovered approximately $580,500—$18,500 from a cleanup of equipment in February, and $133,000, $238,000 and $191,000 respectively, from dredging operations in May, June, and July. During 1947 Yukon Cons. produced bullion valued at $1,329,155, from dredging operations. The company has had seven bucketline dredges in operation. A new method of dragline dredging was started on Jensen Creek in July. G. Goldthorp Hay, president of the Yukon company, has stated that only the company's hydroelectric developments have made it possible to continue mining under present high costs.

★United Keno Hill Mines has purchased the 150-ton concentrating plant formerly operated by Gold Belt Mining Co. at the latter's property in the Sheep Creek district. The equipment is now being moved to United Keno's silver-lead operations at Mayo, and is expected to increase the company's daily treatment rate to 175 tons.

ALASKA

Alaska Antimony company begins production on Boulder Creek—Council district rules on navigable streams

★An interesting feature of the mineral production for 1947, according to the U. S. Bureau of Mines report from the San Francisco office, was that zinc was recovered for the first time. In 1947, gold production in the Territory increased 23% over the 1946 figures, silver 58%, lead 130%, and copper was six times greater than the previous year. Total value of the five metals was $9,946,268, almost $2 million greater than in 1946. Last year the total value of gold was $9,799,580; silver, $59,866; copper, $5,040; lead, $76,032; zinc, $5,750.

The five leading gold producers responsible for 61% of the total were the United States Smelting, Refining

& Mining Co., in the Fairbanks area, New York Alaska Gold Dredging Corp., in the Tuluksak-Aniak area, Cripple Creek Mining Co., in the Innoko area, Arctic Circle Exploration Co., in the Fairhaven area, and Yukon Placer Mining Co., in the Fortymile area. The most important producer of silver was the U. S. Smelting, Refining & Mining Co. The copper, lead and zinc output was limited to two mines in southeastern Alaska, the Riverside mine, near Hyder, and Big Four Mining Co.'s Maloney mine.

★Two of four dredges of the United States Smelting, Refining & Mining Co. at Nome which have been idle for six years were operating with crews brought in by plane from Seattle.

★Charles Kraemer, of Chititu Mines on Chititu Creek, and Jack O'Neill, of Dan Creek Mines in the McCarthy area, are doing development and prospecting work this season.

★Alaska Antimony Mining Co., with property on Boulder Creek near the Tok-Salinas road, expected to start production in September. Equipment, including a bulldozer and compressor, was taken in from Fairbanks. The two 4,000-ft. runways being constructed will be used in the movement of ore. In winter the ore will be trucked to Fairbanks, according to P. X. McGahey, of Fairbanks, who is associated with Q. P. Harris and D. H. Joesting in the enterprise.

★At a meeting of the miners of the Council district this summer, Fred K. Dent, Nels Swanberg, Jr. and Richard E. Lee were appointed to propose rules to be submitted to the Miners' Meeting concerning navigable streams. The three rules on which 16 voted acceptance and three declined to vote provided:

(1) Owners of valid placer locations embracing within their boundaries any portion of the bed of a navigable stream shall have the exclusive right to prospect and mine such portion.

(2) Owners of valid placer mining locations abutting ordinary high water on the banks of navigable rivers shall have exclusive right to prospect and mine the beds of navigable streams abutting such placer mining locations from mean high water to the center or thread of the stream at summer low water.

(3) The rights of exclusive possession for the purpose of prospecting and mining in these rules and regulations provided are for the temporary use of the beds of navigable streams, shall not confer any property right, and apply with equal force and effect to all valid mining locations heretofore made, and all those hereafter made. The application of these rules is by this meeting limited to the Niukluk River in the Council district of the Seward Peninsula.

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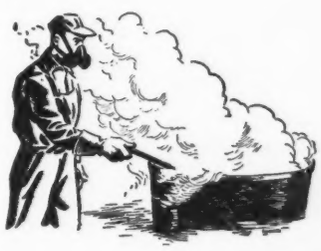

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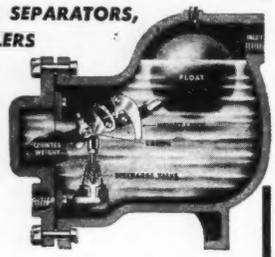

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MEXICO

Dos Cabezas and La Mojina shipping to A. S. & R. smelter—Asarco company to build 480 homes for workers

★The Mexican Mining Association, Mexico City, has asked the Ministry of Finance to exempt metals and minerals from the additional 15% ad valorem tax on exports, and the miners union called an emergency meeting of the heads of all its sections in Mexico City in mid-September, to discuss situations stemming from this tax and the monetary devaluation decreed last July 22.

The Association pointed out that mining has had the benefits allowed by more pesos per dollar (some 6.85 instead of the former 4.85) almost wiped out by taxes, not only on export but on production, and such unavoidable increased costs as for machinery, equipment, freight rates and services priced in dollars.

★President Miguel Aleman dealt but little with mining in his annual message to the nation Sept. 1, on the occasion of the opening of the 1948-49 Congress. The message covered the period, Sept. 1, 1947 to this Aug. 31. "The Government has given attention to the creation of norms that defend and impulse this basic industry," the President said regarding mining. The 23-point program President Aleman announced in his message for economic recovery had these points of interest to the mining industry:

A free foreign exchange market continues until an adequate exchange rate is found, the Bank of Mexico intervening whenever that is deemed necessary; the Bank will fix the new parity of the peso when information is available that makes it evident that there can be a monetary stabilization; the 15% ad valorem tax on exports is intended to prevent rising prices of exportable articles in the home market; if there is difficulty in selling exportable articles to countries that have little money, the barter system will be established; import tariffs will be revised with the tendency to lower them in justified cases on prime necessity or semi-fabricated articles as well as on machinery and equipment that are not produced in Mexico; industrialization will be channeled toward the transformation of prime necessity articles and national resources, and the coining of silver money will be continued to the maximum of the Mint's capacity.

★The Mexican Proletarian Confederation has demanded that the minimum daily wage, which is set every two years by zones and now varies from 3.0 to 8.20 pesos (43c. to $1.14), be raised to 15 pesos and be made national.

★Mining in the northwest has been stimulated with increased work by two American-owned companies, the Cia. Explotadora de Minas Dos Cabezas, S. A. and the Cia. Minera La Mojina, S. A. Western World Industries, Inc. of Utah has an important interest in both companies. Dos Cabezas is operating a 50-ton flotation mill at its mine near the Sonora-Chihuahua line, the outlet for which is Nueva Casas Grandes, Chihuahua. The mine is regularly shipping gold and silver concentrates to the American Smelting & Refining Co. smelter at Chihuahua City. La Mojina is exploiting a big lead deposit near Gallego, Chihuahua, and ships to the A.S.&R. smelter.

★Cia. Minera Asarco, S. C. has started building 105 model homes for workers of its Monterrey, Nuevo Leon, unit. These are the first of 480 homes the company will build under the recently-made agreement with its Monterrey employees. Each worker gets a home by paying a day's wage a week.

★Cia. Metalurgica, S. C. at its Los Jales mines, Pedernaillo, Zacatecas, has signed a new labor contract raising wages 40 centavos (six cents) a day per worker and increasing pension benefits, indemnifications for incapacity from illness or injury, and affording more free medical service and medical attention for employees and their families.

CHILE

Bethlehem Chile company to develop Romeral iron deposit—Metal and mineral production high in 1948

★Bethlehem Chile Iron Mines, whose El Tofo high-grade iron mine has only about 18 million tons of exploitable ore left of its original 45 million, is preparing to develop and mine its newly acquired Romeral deposit northeast of La Serena. Exploitation of this small but high-grade mine, with known ore reserves of 18 million tons similar in grade and composition to those of El Tofo, will require a new railroad and a new port, to be built at Punta de Teatinos, some 10 miles north of La Serena.

The Bethlehem company is increasing output at El Tofo and plans to export to Sparrows Point 2.5 million tons of 60% iron ore in 1949 and 1950, against 1.7 million tons in past normal years. Labor of the camps has been increased from 500 to 750 men, height of benches will be decreased from 99 ft. to half that height; new shovels will be of smaller capacity and all blasting will be done from churn-drill holes instead of from a combination of these and tunnels.

★Production figures for metals and minerals in 1948 are reaching new high levels in Chile, as shown by the

table below. The average monthly outputs (1st column) were computed from the years 1938, and 1942 through 1947. The average for iron for those seven years is low because El Tofo production was brought almost to a standstill during the war by lack of ships. Figures shown are thousands, except for gold.

CHILEAN METAL AND MINERAL PRODUCTION

(Nitrate, Copper, Coal, Iron, in Metric Tons; Iodine and Gold in Kilograms. Figures shown are thousands, except for gold.)

	Average Monthly Output (7-yr. per.)	1948 Jan.	Feb.	Mar.	Apr.
Nitrate	113.2	146.7	142.4	161.0	152.0
Iodine	74.0	65.3	107.8	131.8	134.1
Copper	36.7	34.8	33.8	37.9	38.0
Coal	177.0	195.0	175.0	190.0	195.6
Iron	39.4	131.9	123.9	119.2	118.9
Gold	533.0	328.0	256.0	421.0	439.0

★Caja de Crédito Minero has again raised its schedule for ores. Ten per cent copper ore is paid for at the rate of $31 per metric ton, with an up-and-down scale of $5.32 per unit, the gold in this ore bringing $39 per oz. Copper concentrating ore brings $5.37 per metric ton for 2.5%, with a scale up and down of $3.06 per unit. Lead ore obtains $61.3 per metric ton for 25% ore, with a scale up and down of $5.15 per unit; lead concentrating ore, $16.1 per metric ton for 10%, with the up-and-down scale at $2.74 per unit.

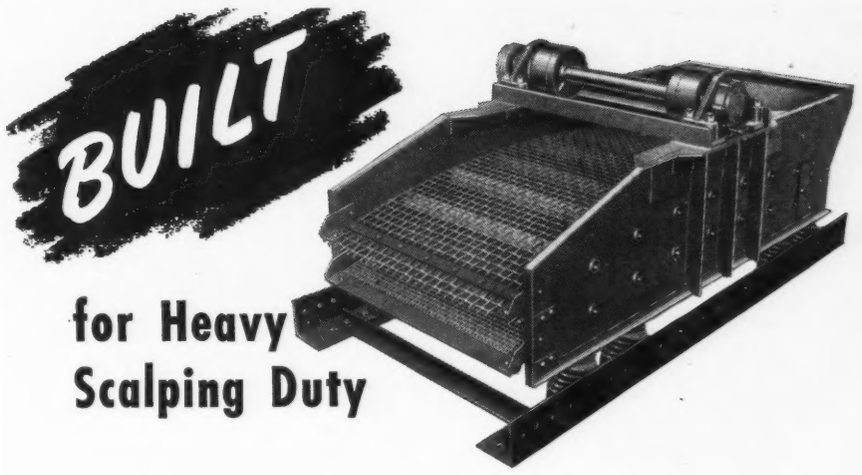
★President Gonzáles Videlo recently inaugurated at Iquique the first nitrate mechanical loading plant to be built in Chile. The new plant, built by the Tarrapacá and Antofagasta Nitrate Co., will permit the entire loading of nitrate into ships at the Iquique wharf from the railroad cars to be done by conveyor belts without the use of manual labor.

COLOMBIA

★According to the Bank of the Republic, gold production in May was 26,166 troy oz., bringing the total for the first five months of 1948 to 138,993 troy oz., or a decrease of 25.9% from last year's figure for the same period.

★Production of silver, which before the war was sufficient to fill interior demands, has steadily decreased in Colombia since 1943. Because of the difficulty of importing machinery and supplies, gold miners abandoned the exploiting of this by-product and in the last few years exports from Mexico have supplemented silver for coinage purposes. From 207,710 oz. in 1943, production fell to 110,830 oz. in 1947, with estimates for the current year at about the same level.

★Colombia maintains its position as the third platinum producer of the



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Colombia *(Continued)*

world. Production of this metal has increased 20% since 1943, reaching a total of 40,047 oz. in 1947.

★The Government of Colombia has been negotiating for a loan from the World Bank to equip a 300-ton metallurgical plant which will exploit iron deposits at Paz de Rió. Balance of the capital will be subscribed in Colombia by individuals and the Government. Total capital needed was reported at 100 million pesos, with 28 million dollars allocated to purchase of equipment in the U. S. Technical studies have been completed concerning raw material, transportation, labor, power and markets for the project.

PHILIPPINES

Atok-Big Wedge employees demand wage increases—New Lepanto mill shipping copper concentrates

★Following the decision of the Court of Industrial Relations in the Masinloc chrome mine case, which was overwhelmingly adverse to the operating company, the Benguet Consolidated and Balatoc mining companies granted concessions to employees affiliated with the Benguet-Balatoc workers union. The mining companies agreed to recognize the union as the sole collective bargaining agency in the employment of workers and granted two weeks vacation with pay and sick leave not exceeding two weeks with pay during one year of consecutive employment. The companies also agreed to improve housing conditions and to create a grievance committee composed of two company representatives, two from the union, and a representative from the labor department as chairman.

Employees of the Atok-Big Wedge mine made similar demands, including a raise in the daily minimum wage from 1.50 pesos to 3 pesos and a 50% increase on actual rate for night shift work. Adoption of the check-off system was proposed and demands included a provision that management should not employ any new worker except through the medium of the union.

★Lepanto Consolidated is producing about 50 tons per day of 30 to 35% copper concentrates at its new mill. A cut-and-fill method of mining is being used instead of shrinkage stoping. A ventilation raise now being driven will improve operating conditions. Concentrates are hauled to San Fernando for shipment to the U. S. at a trucking cost of $8 per ton.

★July production at the Benguet-Balatoc mill was $257,000 from milling 36,450 tons. The long Bobok timber tram has been completed which will result in substantial reduction of timber costs.

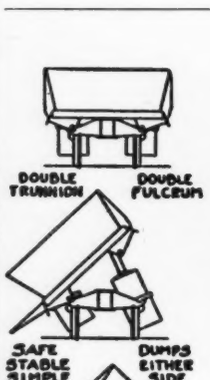
★Mindanao Mother Lode had a production of $95,700 in July from 6,400 tons milled. Millheads at $14.80 per ton were much below prewar averages, attributable in part to the large amount of low grade ore going to the mill from the development drifts now being run. The counter-drift on the 850 level of the Tabon vein has been advanced 140 ft. from the shaft, at which point water doors are being constructed.

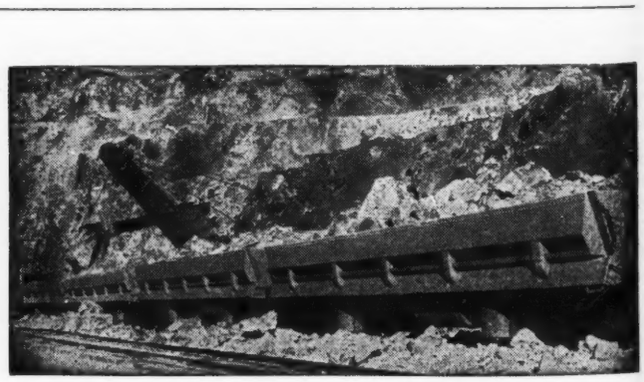
★Misamis Chromite, in southwestern Mindanao, had about 1,000 tons ready for shipment on July 31. The ore is relatively high grade, averaging 50% CR_2O_3, with a chrome-iron ratio of 2.8:1.

AFRICA

Northern Transvaal Exploration will sink shaft—Large companies re-estimate ore reserves

★Of the total tax concessions of £6,210,000 announced under the first





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budget of the new Nationalist Government of South Africa by Mr. N. C. Havenga, Minister of Finance, concessions to the gold mines will amount to £900,000. The budget provides a changed tax formula and an increased amortization allowance for gold mines. Actually, it will mean a deferment of taxation, the mines receiving the benefit of amortization allowances at an earlier stage. The effect, however, will be to increase the amount of taxable income in later years when the capital expenditure will have been liquidated.

★Northern Transvaal (Messina) Exploration, Ltd., will sink the first shaft on its property in the northern Transvaal, following borehole results which seem to justify exploring the orebodies located. No. 5 borehole was stopped at an incline depth of 1,167 ft., after intersecting four distinct horizons of copper mineralization. At 339 ft. a zone of mineralization 9.35 ft. thick averaged 1.55% copper; at 380 ft. the zone was 8.9 ft. thick averaging 2.06% copper; at 600 ft., 6 ft. averaging 5.69% copper; at 610 ft., 5 ft. averaging 2% copper.

No. 6 borehole intersected a zone of mineralization 7.5 ft. thick, averaging 1.34% copper. In No. 7 borehole core recovery was incomplete between 225 ft. and 229 ft. Core recovery of 2 ft. 9 in. averaged 8.85% copper, while a sludge sample taken over the entire width measuring 3 ft. 7 in. averaged 4.18% copper.

★Union Platinum Mining Co. in one of its boreholes in the Rustenburg area, Northern Transvaal, recently intersected the platinum zone at a vertical depth of 1,081 ft., and the core assayed 28.1 dwt. over 10 in., and 1.4 dwt. over 12 in., giving an average of 13.54 dwt. over a width of 22 in.

★Consolidated Murchison (Transvaal) Goldfields and Development Co., Ltd., has been informed by the Commissioner for Inland Revenue that the objection by the company has been allowed and that its income tax assessed for the year ended June 30, 1947, will be revised by determining separately the taxable incomes from gold mining and antimony mining. This altered basis will considerably reduce the company's liability for taxation.

★Recent drilling by West Witwatersrand Areas has indicated that the depth of the reef at the southern boundary of the area is considerably shallower than the 8,500 ft. estimated at the time of application for the mining lease, it was stated by the chairman at the first general meeting of the Doornfontein Gold Mining Co.

Borehole E. 9G on Varkenslaagte No. 46, and about 5,000 ft. west of the Doornfontein western boundary, intersected the Main Reef at a depth of 6,168 ft. and the Carbon Leader at 6,470 ft. The Main Reef assayed 5.2 dwt. over a corrected width of 15.3 in. and the Carbon Leader 8 dwt. per ton over a corrected width of 16 in. The information obtained from borehole E. 9G, if substantiated by either borehole E. 8E or E. 8F on the Doornfontein property, will greatly improve potentialities of the western portion.

★The Central Mining-Rand Mines administration has announced ore reserves for the following companies, re-estimated as of June 30, 1948, and compared with the figures as of June 30, 1947. Certain additional reserves in shaft and safety pillars not at present available for stoping are not shown on the table below.

Name of Company		Available Ore Reserves (Tons)	Ave. Value (Dwt.)	Est. Stoping Width (In.)
Blyvooruitzicht	1948	6,043,000	13.8	45.
G. M. Company	1947	5,853,000	14.2	45.
Cons. Main Reef	1948	4,199,000	3.7	55.2
and Estate	1947	4,974,000	3.7	55.8
Modder East	1948	4,555,000	3.3	43.0
	1947	5,216,000	3.4	43.2
New Modder G. M.	1948	89,600	4.3	42.8
Company	1947	435,700	3.1	41.5
Nourse Mines	1948	2,269,000	4.7	46.5
	1947	2,329,600	4.9	45.9
Welgedacht	1948	472,000	3.9	40.2

★New Consolidated Gold Fields, Ltd., announces that ore reserves of the following companies have been re-estimated as of June 30, 1948, and compared with figures for the same date of 1947.

Name of Company		Available Ore Reserves (Tons)	Ave. Value (Dwt.)	Est. Stoping Width (In.)
Libanon G. M. Co.,	1948	1,815,000	4.4	63.4
Ltd.	1947	1,109,000	4.5	66.4
Luipaards Vlei	1948	2,649,000	4.8	45.5
Est. & G. M. Co.	1947	2,634,000	4.8	45.8
Sub Nigel, Ltd....	1948	2,414,000	10.1	34.8
	1947	2,506,000	10.6	35.1
Venterspost G. M.	1948	2,649,000	5.3	69.0
Co., Ltd.	1947	2,460,000	5.4	71.7

★Beatrice Gold Mining Co., Ltd., has announced, with regard to the Empress gold mine, Southern Rhodesia, that the first of a group of boreholes now being drilled from underground has located an orebody beyond the present bottom of the mine and about 400 ft. below surface. The drill gave a normal intersection of the tabular orebody and showed regular gold values averaging 2.24 dwt. over a true width of 30 ft. Additional short holes are now being drilled to determine the further continuation of the orebody along the strike.

★Spaarwater Gold Mining Co. has announced that the tonnage milled during July was 10,000 tons, yielding 2,675.40 oz. of gold, the revenue from which was £23,117. The expenditure on mining and milling was £16,545 and on development was £9,255. The immediate expectation was for a depletion of cash assets in order to meet the excess of expenditure on development over profit from milling.

★The report of drilling operations by Free State Development and Investment Corp., during the quarter ended June 30, shows a total footage drilled of 9,589 ft., of which 5,526 ft. were drilled by other companies in joint

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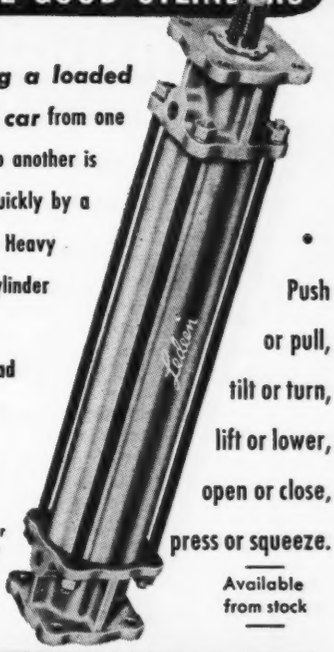

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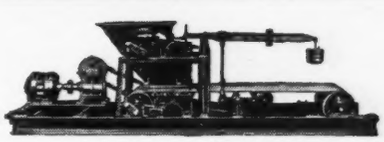

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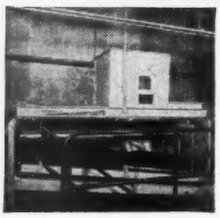

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Africa (*Continued*)

boreholes. Borehole W.D.R. 1, on the farm Wilhelmina 548, was completed, the deflection showing 13 dwt. over 23 in. at a depth of 5,472 ft. on Leader Reef, and negligible gold content on the Basal Reef horizon.

★Development of the copper deposit at Tsumeb in Southwest Africa appears to be progressing satisfactorily. The mine, which was reopened by the Tsumeb Corp. in 1947 after six years of inactivity, produced 24,349 tons of concentrates in the first quarter of this year and shipped overseas 19,656 tons valued at £321,073. Assays of the concentrates averaged 7.3% copper, 29.09% lead, 13.11% zinc and 6 oz. of silver per ton. Reserves now consist largely of a complex variable mixture of the sulphides of copper, lead and zinc together with cadmium, silver and, in some cases, germanium and gallium.

★It is announced that the Government, on a recommendation by the Minister of Labor, will appoint a commission to inquire into claims of mineworkers for wage increases and improved working conditions. The commission is to report on (1) the remuneration and conditions of employment of daily-paid employees in the gold mines, with special reference to their claims in regard to wages, hours, leave conditions and pension schemes; (2) the effect of any variation of existing remuneration and conditions of employment of such employees upon the gold mining industry itself and upon the financial position of the Union of South Africa.

INDIA-BURMA

Mysore considers nationalization of Kolar gold field—Mawchi Mines reports 1948 production

★Nationalization of the Kolar gold field has been under consideration, according to the Government of Mysore State. The 20-year lease of the four mines, which have been managed by John Taylor and Sons, London, is due to expire soon and the State is studying the question of direct or joint ownership of the operation.

Balance sheets covering the nine years from 1939 through 1947 show that despite an increase in the price of gold from Rs. 103.3 (about $31) an oz. to Rs. 286.6 (about $86), the net surplus to the company after payment of gold duties, royalties, taxes and working costs has fallen from Rs. 25.8 ($7.75) to Rs. 14.5 ($4.35). In the same interval production per man employed fell from 31.8 long tons a year to 24.7 long tons, while payments to workers per year rose from about $93 to $238.50.

★To speed up transport of manganese ore from mine to port, the Indian Government has announced that intending exporters who apply with proof of licensed shipments to dollar countries will be afforded special rail facilities.

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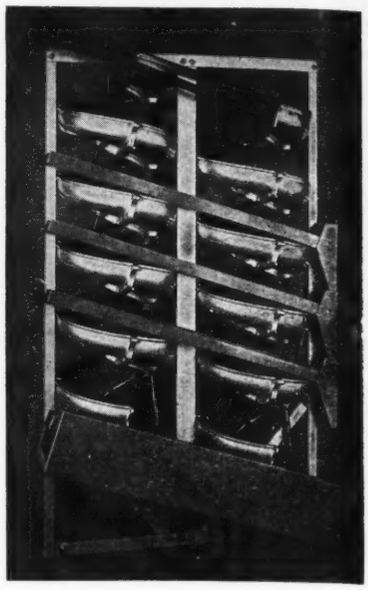

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★The following communique has been received from the Government of Burma in reference to a report (E&MJ, May, p. 153) by Dr. Oo Hla that thorium and uranium had been discovered in Burma:

"Much publicity has been given to a statement made by Reuters on Jan. 13, 1948, to the effect that it was officially learned that thorium and uranium had been found in Central and Eastern Burma and that they exist in large quantities in certain parts of Burma. There is no basis whatever for the statement which has been made by Oo Hla in his private capacity and not as Secretary to the Council of Burma Industries, which, though recognized by Government, is not Government-sponsored."—signed, Kyaw Min, Financial Commissioner (Commerce), Burma.

★Mawchi Mines, the Burma tin-wolfram property, after expending the greater part of its resources on war damage reconstruction and rehabilitation since 1945, resumed production last March. By the end of May mixed concentrates produced amounted to 212 tons. According to a progress report issued late in June, completion of essential installations had restored

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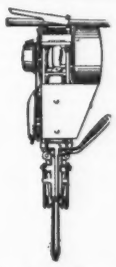

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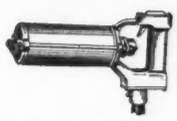

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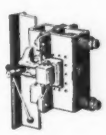

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the property to full-scale capacity, but the underground labor force was only about one-fourth the requisite number for full operation. Further underground reclamation work was necessary before an estimate of ore reserves could be made.

★The Indian Government has set up an Atomic Energy Commission headed by Dr. Homi J. Bhabha, director of the Tata Institute of Fundamental Research, to work with Prime Minister Nehru on survey and development of India's resources of fissionable material.

★Tonnage hoisted in the Kolar field in July totaled 15,911 fine oz., compared with 13,572 the month previous. Mysore State contributed 4,870 fine oz., Champion Reef 5,203, Ooregum 2,360 and Nundydroog 3,478.

★The Mica Advisory Committee of the Indian Government has decided to continue to allow the import of mica from Brazil and other countries for processing and re-export, despite the protest of industry interests that the practice would tend to undermine India's dominant position in the field. The committee indicated it was agreeable to some sort of export restrictions to protect the Indian trade.

AUSTRALIA

Subsidy announced for three mines of Western Australia—Electrolytic Zinc reports increased output

WESTERN AUSTRALIA

★Uneasiness over the possibility of Australia following New Zealand's lead in appreciating the pound to parity with sterling has caused a flurry of consternation on the gold fields, with costs already bumping against the inflexible gold price ceiling. Such a move would mean that the mines receive only 5/1 per $1 (or 1/35 oz. of gold) instead of 6/3 under the present exchange rate.

★Federal Government financial assistance will be given to three Western Australian gold mines this year. The subsidy is designed to keep them in operation, and to prevent the abandonment of townships. In making this announcement, the Prime Minister emphasized that the subsidy was not a general one for gold mining. It applied only in individual cases. Mines which could still pay their way, or those suffering too great losses would not receive assistance. The Government's decision follows a claim by the Western Australian Chamber of Mines that 15 gold mines in the State would be forced to close because the present price of gold did not allow sufficient margin to offset rising costs.

★At the first annual meeting of New

AT THE WILLIAMSON DIAMOND MINES, Shinyenga, Tanganyika, Africa, Caterpillar tractor pulls scraper; certain sections of the earth have yielded 300 carats per cu. yd. Though mining operations are on a small scale, net income averages £70,000 a month.

Australia (*Continued*)

Coolgardie Gold Mines, N. L., the chairman announced that the main shaft in the Hampton group of leases had been sunk to a depth of 300 ft. Practically no development has been possible on the lode since all the compressed air available was required for shaft sinking, but this will now be stopped temporarily. Directors are anxious to bring into production the Burbanks group, where prospects are good for finding more ore.

★Until the new main shaft is available for mining at Central Norseman, the mill feed will come mainly from stopes above the 20 ft. level, some of which are approaching exhaustion, and the grade will therefore be below the average of the reserves. Reduction in costs is expected when the new shaft is operating because of its favorable position in relation to high-assay new oreshoots.

★At Central Norseman's Phoenix mine, the new shaft has been sunk to 1,200 ft. The first of the exposures at 600-ft. depth is a well defined narrow reef which averaged 27 dwt. over 9 in. width for the 17 ft. exposed. The second at 1,000 ft. appears to be a much stronger feature and averaged 7.1 dwt. over 48 in. width for the length of 12 ft. now exposed in the shaft. At Princess Royal the No. 7 level has been continued and has exposed 90 ft. of reef, of which the first 35 ft. averaged 11.1 dwt. over 72 in., the remainder having errating values of low average.

★At the Lady Miller workings of Central Norseman oreshoots occur in a wide band of sediments dipping west about 45 degrees. Mineralization here is associated with drag folding. The No. 2 level has connected with the old workings to the south, and stoping has begun. The recent drilling on this level has shown values in the hanging wall, five holes averaging 13 dwt. over 75 in. A crosscut just completed near the most northerly of these holes exposed 72 in. of lode assaying 18.9 dwt.

★Dr. Deborah Buller Murphy, managing director of a group of rare-metal mines and one of the few women in the world to head a mining group, is proposing to float a £200,000 ($650,000) company in Melbourne to refine tantalum and other rare metals in Western Australia. The group controls workings at Wodgina, Strelly and Tabba Tabba in the Pilbarra district. The refinery is expected to cost £80,000 ($260,000).

★Fuel for the mines is becoming an increasingly difficult problem. Although many mines use oil fuel, many depend upon firewood, the cost of which has risen from 19s. per ton in pre-war years, to over 40s. per ton. Cyandide and borax glass are in very short supply and stocks are decreasing, while the position in regard to machine spares is acute.

NORTHERN TERRITORY

★Influx of gold-mining capital into the Territory continues. Two companies to be formed by a new Melbourne finance concern, Lady Claire Gold Underwriters, N. L., are to develop gold leases at Tanami, 300 miles west of Tennant Creek. The companies will be known as Lady Claire Gold No. 1 and No. 2 and will each have a capital of £100,000.

SOUTH AUSTRALIA

★The Broken Hill Proprietary Co., Ltd., in accordance with its policy of decentralization in the manufacture of steel, plans to establish a fully equipped steelworks at Whyalla. This town is the port of shipment for iron ore from the mines, some 40 miles inland, to the steelworks of the company at Newcastle, and the works of Australian Iron and Steel, Ltd., at Port Kembla, N. S. W. The Broken Hill company has installed a high-class crushing, conveying and loading plant at Whyalla and has improved the port so that large ships can load at the jetty. A modern town has been built and a large shipbuilding yard established.

VICTORIA

★A £50,000 company, Ballarat South Goldfields, N. L., has been established in Melbourne to explore reefs along the Golden Point Gutter, from which millions of ounces of gold were taken in Ballarat's heyday. Ballarat plans to sink to at least 400 ft. the 130-ft. shaft near the north end of the leases which was sunk in 1888 by the Leviathan Gold Mines Estates, N. L.

★Central Victoria Dredging Co., N. L. is erecting a new dredge at its Jim Crow property to operate with 6-cu.-ft. buckets. At the upstream end of the Jim Crow Creek a lease application has been made for an extension estimated to contain an excess of 1 million cu.yd. of payable ground.

TASMANIA

★Output of zinc at the Risdon works of Electrolytic Zinc. Co. of Australasia, Ltd., which treats the zinc concentrates of mainland producers and of its own mines on the west coast of the island state, was 75,395 tons in 1947, compared with 70,314 tons in 1946. Ore treated at Electrolytic Zinc's own mines totaled 125,226 tons, against 122,680 tons in the preceding year. Output of lead concentrates was 9,125 tons (8,564), zinc concentrate 37,450 tons (39,009) and copper concentrate 3,160 tons (3,114).

JAPAN

★Mitsui Mining Co. expects to complete rehabilitation of two furnaces at the Miike Zinc Works by December. The six furnaces now in operation produce approximately half of Japan's present monthly output of 1,400 tons of zinc.

Before the end of the year production of zinc sheet at Miike will reach 100 tons per month, according to estimates of the Economic and Scientific Section of SCAP (Supreme Commander for the Allied Powers).

★Toho Zinc Co. reported that reconstruction of the Taishu lead-zinc mine on Tsushima Island was almost complete early in July. The new concentrator will treat about 2,500 tons per month for the first 6 months, with increase to 5,000 tons per month planned for early 1949. A new thermal power plant will be in operation late this year.